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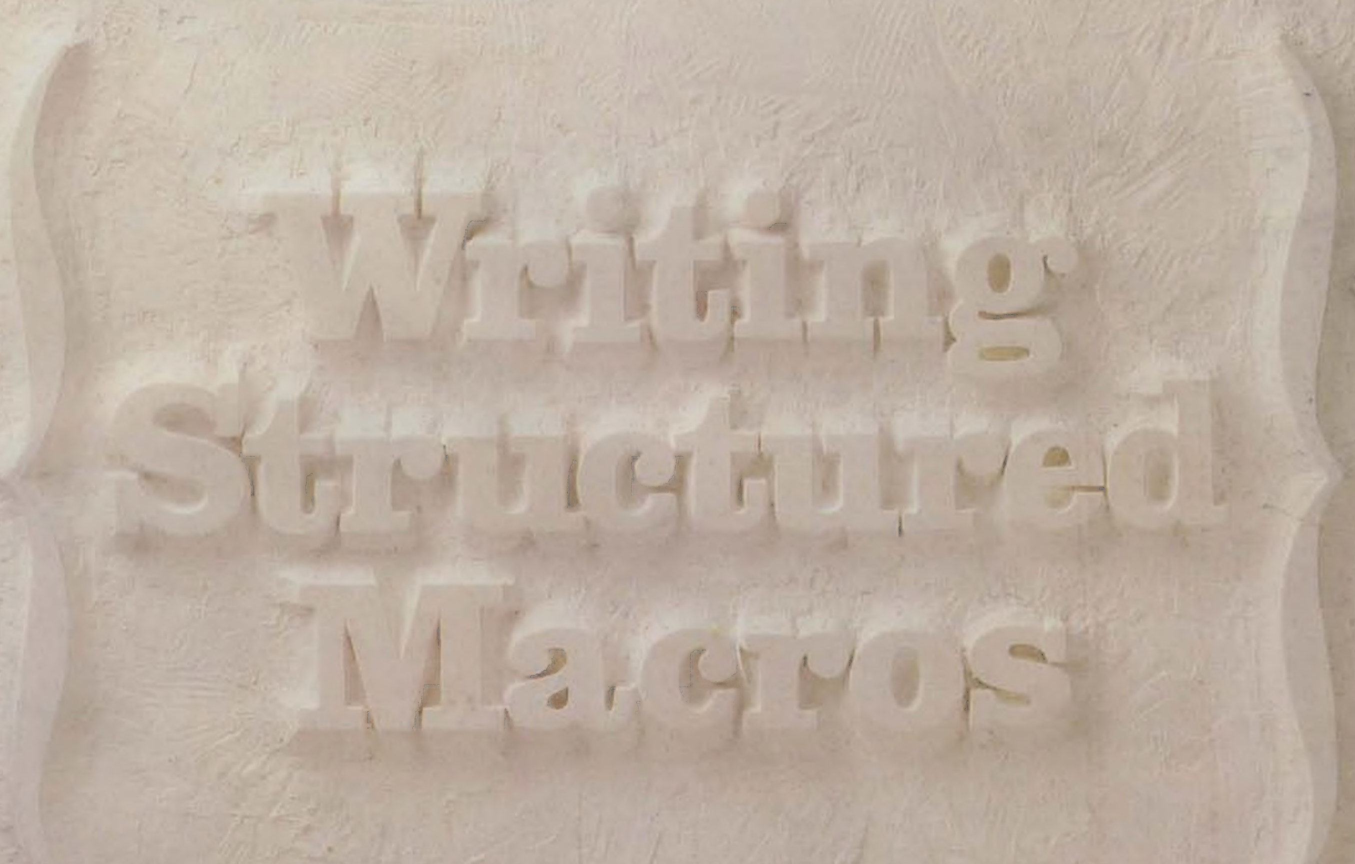
COMPUTING FOR MANAGERS AND PROFESSIONALS

AUGUST 1985 $3.00



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CIRCLE 101 ON READER SERVICE CARD

LOTUS
COMPUTING FOR MANAGERS AND PROFESSIONALS

VOLUME ONE/NUMBER FOUR AUGUST 1985

DEPARTMENTS

FEATURES

RESOURCES

ABOUT THE COVER:
Sculptor Nicholas Fasciano has fashioned a concrete symbol to illustrate our cover story, "Writing Structured Macros," beginning on page 64. Photo by Peter Kane.

Survival kit for

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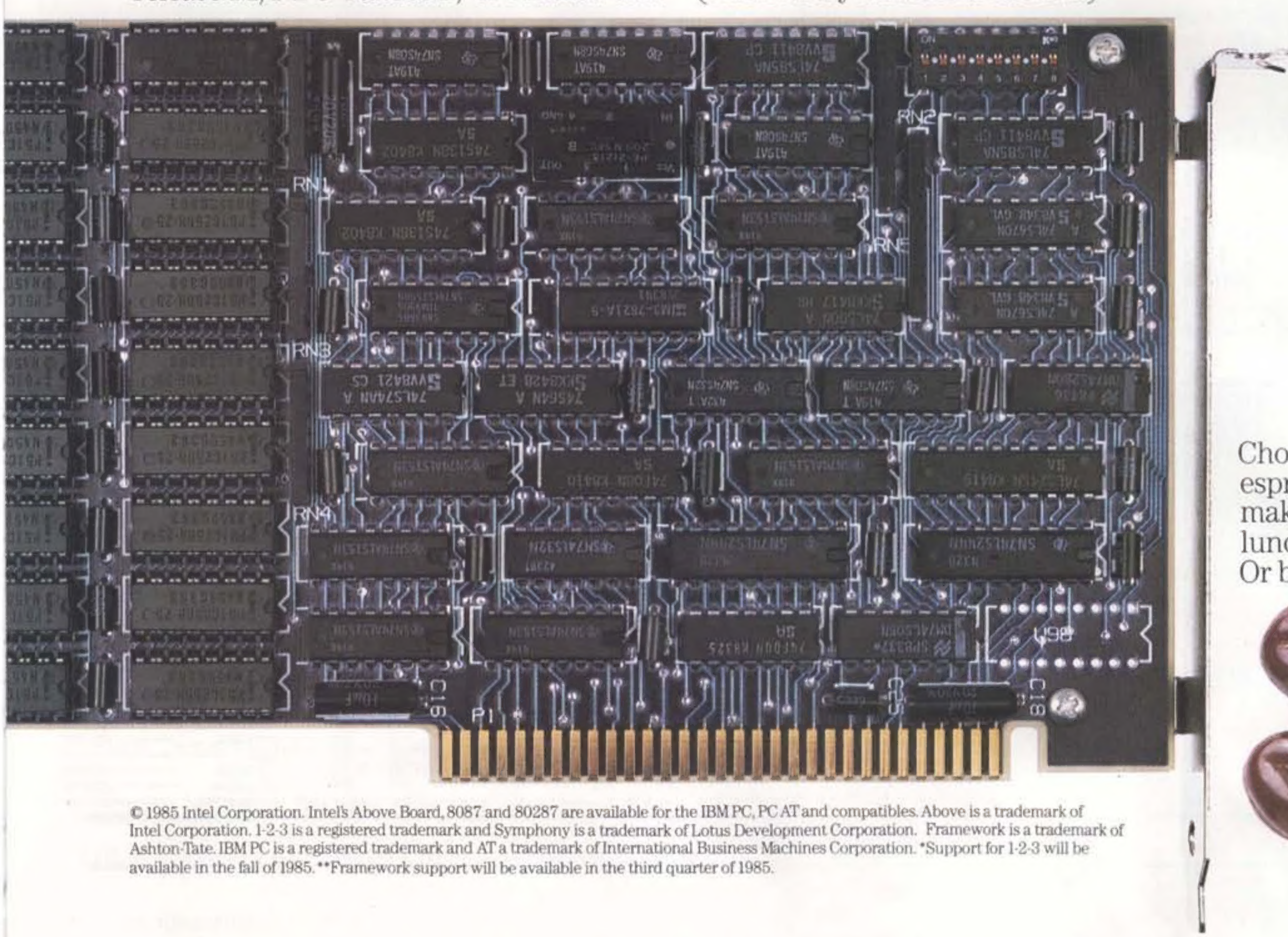

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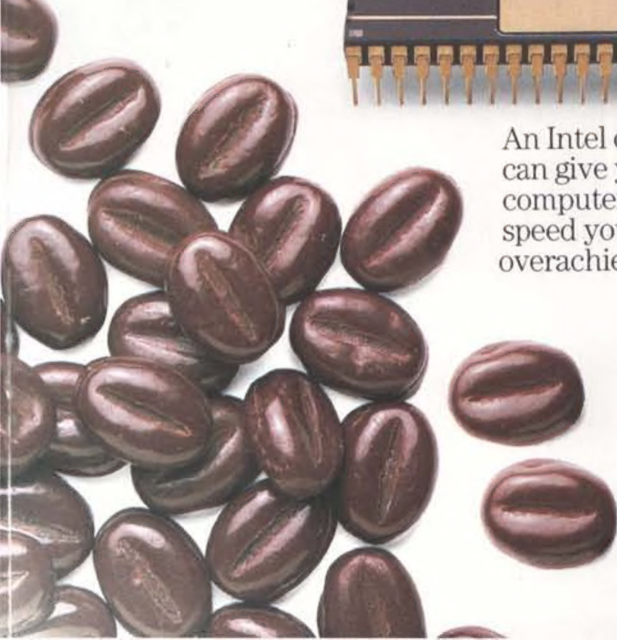

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CIRCLE 102 ON READER SERVICE CARD

LOTUS

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PUBLISHER'S LETTER

THANKS FOR WRITING

In our premier issue in May, we asked you to use the Reader Service card to rate the articles and to comment on things you liked or disliked about LOTUS. So far, we've received almost 3,500 cards with evaluations of the May issue, plus hundreds of letters. We also completed 300 telephone interviews with readers chosen at random.

Your responses have helped us make immediate improvements to the magazine and to plan others for the future. Here's a report:

The highest-rated section in the May issue was Resources, which 96 percent of you rated excellent or good. The Q&A and Good Ideas columns contributed the most toward these scores. In the June issue we added a breakdown of Resources to the Reader Evaluation listings so that you can help us fine-tune this section.

The highest-rated individual article was the *1-2-3* Macro column. The *Symphony* Macro column received surprisingly high scores considering only about 30 percent of you are using *Symphony* now.

Readers who said LOTUS articles should be more advanced or technical outnumbered those who want less-technical information by about 5 to 1. While both groups represent only a small percentage of readers, we are considering ways to beef up the technical coverage without reducing the material we provide for less-advanced readers. Our research shows that 40 percent of you write programs or macros for others, so we want to serve those interests. The article on writing structured macros in this issue is an example.

Many of you asked if we would write articles about using Lotus software with non-IBM systems. Most frequently mentioned were Hewlett-Packard, Digital Equipment Corporation, and Texas Instruments systems. Checking earlier research, we found that 29 percent of the computers LOTUS readers use are not IBM compatible. We are now planning editorial material to assist readers with those machines. We also received a lot of good advice on the mechanics of producing LOTUS:

- Many of you correctly pointed out that it was difficult to find specific articles in the May issue because there were too few page numbers. Problem was, the full magazine title, month, year, and page number take up too much space when a reader-service line appears on the page. We solved the problem by using only the page number in such situations.
- Several readers appreciated that we do not continue articles from one part of the magazine to another, so you don't have to jump around to read one article. We have no plans to change that policy.
- "Fair's fair," said one reader. "If you want my opinion on your articles, you should at least pay the postage." Starting this issue, you'll find a postpaid Reader Evaluation card. You must still apply postage when requesting information from advertisers, but you'll need only 14 cents instead of 22 cents, thanks to an alert reader who told us to change the size of the cards.
- Two readers said LOTUS has too much advertising. That's a problem we don't intend to solve until ad pages get to the maximum we've set for the magazine—114. Thanks again for writing. Please let us know when there's something you want us to do or that we could do better. You can be sure we'll pay attention.

Daniel A. McMillan

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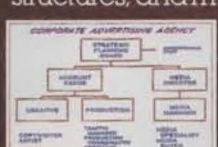
New DIAGRAM-MASTER™ helps you visually communicate complex processes and relationships such as: time schedules, product flow, reporting structures, and much more.



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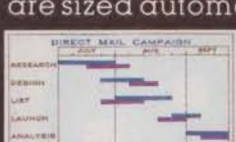

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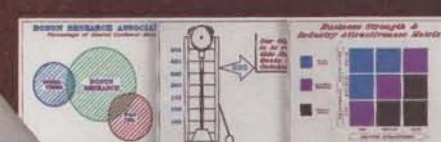

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IBM PC	243	90	85
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You get more than 100% of the performance for less than 15% of the price.

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LOTUS TO PUBLISH PROGRAM FILE FORMATS

Lotus will release the internal file formats of *Jazz, 1-2-3* Release 2, and *Symphony* Release 1.1 in a book to be published this fall by Addison-Wesley and sold in retail stores. Such information will help independent software developers and applications designers work with and interchange data between all Lotus products. By releasing the formats, Lotus is encouraging the development of complementary products that can share data.

"Many independent software vendors have already expressed interest in developing accessories and add-on products for *Jazz*, including a macro capacity," said Eric Bedell, *Jazz* product marketing manager. "Vendors also want to insure that future versions of their products are compatible with *Jazz*," he added.

LOTUS OPENS DUBLIN MANUFACTURING SUBSIDIARY

Two weeks after shipping *Jazz* in the United States, Lotus shipped French and German versions of the integrated package from its manufacturing subsidiary in Dublin, Ireland. Fully operational in June, the building replaces Lotus's Cambridge, Massachusetts, plant as principal supplier to European markets. Representing an investment of over $1.5 million, the facility houses 30 employees and contains 42,000 square feet. Charles Digate, vice president of marketing, says, "Europe currently accounts for about 10 percent of Lotus's annual business, and these markets show potential for strong growth during the next few years."

LOTUS ANNOUNCES NEW COMMUNICATIONS DRIVERS

Lotus is developing two new communications drivers for *Symphony* that are expected to be shipped this fall. *Symphony* users will be able to use the two new asynchronous communications protocols, B protocol and Blast (blocked asynchronous transmission), in addition to the popular XMODEM.

The B protocol driver was developed by CompuServe because of the popularity of the World of Lotus, a Lotus information service. B protocol provides fast and accurate file transfers. The Blast driver will permit *Symphony* to communicate with computers running *Blast*, communications software developed by Communications Research Group (CRG) of Baton Rouge, Louisiana. *Blast* uses an advanced technique to reduce errors in communication between computers running in an asynchronous environment.

CRG officials say *Blast* provides many of the benefits of synchronous communication, such as error checking and increased transmission speed. *Blast* is available for a wide range of micro, mini, and mainframe computers. *Blast* versions support 23 operating systems from major vendors.

Also, Lotus will soon release a previously announced synchronous communications add-in product, *Symphony Link*. *Symphony Link* works with Digital Communications Associates' Irma board, which allows IBM PC 3270 series terminals to access mainframe data. *Symphony Link* permits users to capture IBM mainframe data directly into a *Symphony* worksheet and transmit the data back to the mainframe. It is due to be shipped in midsummer and will be distributed by key Lotus dealers. The suggested retail price is $395.

The B protocol and Blast protocol drivers will be available free to current *Symphony* users. The two asynchronous drivers are supported by the current version of *Symphony* and *Symphony* Release 1.1, scheduled for release this summer. The B protocol driver will be distributed on the World of Lotus. The Blast driver will be distributed by CRG.

SPLITTING Q&A

I suggest that you split the Q&A section into *1-2-3* and *Symphony* sections as the May issue did, and add a few *1-2-3* macros each month. I enjoyed the desktop-accessory review in the May issue. Finally, please include comments about the Zenith 100 and other machines that run Lotus software. The whole world is not IBM-compatible.

R. I. Johnson
St. Louis, Missouri

As you can see from this issue, we have begun subdividing some of the Resources sections by Lotus software categories; we're also adding more macros wherever appropriate. Mr. Johnson's remarks about hardware echo the sentiments of many of our readers. Part of our strategy is to make the information in our articles as generic as possible, while answering machine-specific needs in the various Resources columns.—Ed.

LOTUS UNDERGROUND?

Congratulations on the launching of LOTUS magazine. The rangers here at Lava Beds National Monument utilize Lotus *1-2-3* for programming and tracking expenditures in their numerous accounts, cave-use data storage, and other need-to-know spreadsheet informational documents.

Good luck with what appears to be a much-needed publication.

James Sleznick Jr., Superintendent
National Park Service
Lava Beds National Monument
Tulelake, California

XMODEM CORRECTION

In the short article "Companies Introduce 2400-Baud Modems" (May 1985, page 11), author John Edwards comments that "most 2400-baud modem owners use . . . an error-detection protocol, such as XMODEM, to prevent data-transmission errors." This statement has two flaws. First, XMODEM attempts to detect and correct errors (it's about 95 percent successful); it does not prevent them. Second, XMODEM is a half-duplex protocol. In other words, data can be transferred in one direction only while using the protocol.

This half-duplex restriction limits XMODEM's usefulness to file transfers. Other error-correction protocols are full-duplex. Examples are X.PC, promoted by Tymnet, and the Microcom Networking Protocol (MNP). A full-duplex protocol would be of much more benefit to users who do a limited amount of file transfers.

Richard L. Grier, Project Engineer
Prentice Corporation
Lakewood, Colorado

LETTERS TO LOTUS DEVELOPMENT

The following letter was sent to Lotus Development Corporation's headquarters:

My name is Ilse Guck. I live in Barrington, Rhode Island. I'm nine years old. I was watching TV, and one of your commercials came on. I notice you are not holding the disk right. You should be holding it on the label. You're holding the part where programs are stored. I have a picture of what I mean.

Ilse Guck
Barrington, Rhode Island

MORE DEMO DISKS

In my line of work, free or inexpensive demo disks are a great help as I review software for use on our micros. Please let the advertisers know that for their small expense and my small investment, a lot more sales may be made.

Vickie Colvin
Management Information Specialist
Executive Department
State of Oregon

@ERR BOX

The @ERR box located on page 25 of the June issue should have been more prominent. Corrections are no good if no one knows they're there.

Mark Flint
Blue Cross/Blue Shield
Chicago, Illinois

We are putting corrections in the Letters column so that readers can find them more easily.—Ed.

@ERR

The prices of several C. Itoh printers listed in a table on page 68 of our June issue were incorrect. The correct prices are as follows: Prowriter 1550B – $649; Prowriter 1550S – $700 to $949, depending on the configuration. The Prowriter 1570 has been replaced by the 24LQP, which sells for $1,299 (parallel version) or $1,349 (serial version).

COMMODORE'S AMIGA: A BREAKTHROUGH IN SIGHT AND SOUND

With the introduction in late July of the Amiga, Commodore International Ltd. (CLI) is betting a good part of its future that the machine has the potential to revolutionize the small-business/educational market and to revitalize the home market. The Amiga boasts technical features that no other microcomputer to date has, and with its under $1,800 price, it stands in a class by itself.

Like the Apple Macintosh and Atari 520 ST computers, the Amiga is based on the Motorola 68000 CPU. What separates the Amiga from the Apple and Atari entries, however, are three custom VLSI (very large scale integration) chips that control advanced graphics, animation, user input/output, and sophisticated audio functions. By taking over many of the functions of the 68000 CPU, these VLSI chips let the Amiga operate at a clock speed of 7.8 MHz—faster than IBM's PC AT.

Analysts and software developers who have seen prerelease versions of the Amiga are uniform in their praise for its powerful color graphics and stereo sound capabilities. The Amiga audio comes with a four-voice speech synthesizer.

Amiga Corporation of Santa Clara, California, which CIL bought in 1984, demonstrated a prototype to selected guests at a recent trade show. The demonstration included such computer pyrotechnics as a finely detailed red-and-white soccer ball that rotated on its axis and generated stereo sounds while it bounced around the screen. A near-photographic-quality portrait exhibited Amiga's ability to use its 4,096-color palette to generate subtle color shadings.

"Amiga is an exciting product," said Egil Juliussen, chairman of Dallas-based computer-industry research firm Future Computing. "Of course, it's going to have to compete against another successful product—the Macintosh—that already has large user and software bases. It will take time, but it can catch up. It's too good not to make it."

Commodore International Ltd.'s Amiga

The Amiga will come with its own operating system software called Amiga-DOS. Commodore says Amiga-DOS can run various applications simultaneously. There is also a user interface called "intuition" that is, like the Macintosh, icon-based. (The Amiga will not run Macintosh software, however.) In addition, Amiga-DOS includes interactive windowing and a nonproprietary software bridge that will eventually allow connections to VCRs, projection TVs, stereo amplifiers, and other home/office entertainment/presentation devices. Though at press time Commodore would not confirm it, there are several rumors that Commodore plans to offer a module that will allow users to run some of the same 360K 5¼-inch floppy-disk PC-DOS software that runs on IBM PCs.

The first wave of software to take advantage of the Amiga's advanced technical capabilities will be mostly educational and entertainment. But business packages have also been written or are under development. According to CIL, at the Amiga's introduction there will be *ABASIC* from Microsoft, *Enable/Write* from The Software Group, *Accounts Payable* and *General Ledger* from Chang Labs, *Textcraft* from Arktronics, and *Graphicraft* from Island Graphics. Reportedly the first integrated package will be *Enable/The Office Manager* from The Software Group.

—Sue Kelly and John Edwards

IN BRIEF

Amiga Personal Computer, Commodore International Ltd., 1200 Wilson Dr., West Chester, PA 19380, 215-431-9100. (Information available at press time from Commodore)

Cost: CPU with 256K of RAM, 89-key keyboard, mouse—$1,295
- 14-inch RGB analog monitor—$495
- 512K memory upgrade—$200
- Second 880K drive—$300

Processor: Motorola 68000
Expansion slots: two
Storage: 880K 3½-inch disk drive
Clock speed: 7.8 MHz
Monitor: color
- Number of colors: 4,096
- At high resolution: 16 colors
- At low resolution: 32 colors
- Maximum number on screen: 4,096
- Maximum resolution: 640 by 400 pixels

Ports: two controller, two stereo/audio, one serial, one parallel, one for second 3½-inch disk drive, three video—TV, RGB digital, RGB analog

USING IBM'S PC AT AS A GRAPHICS WORKSTATION

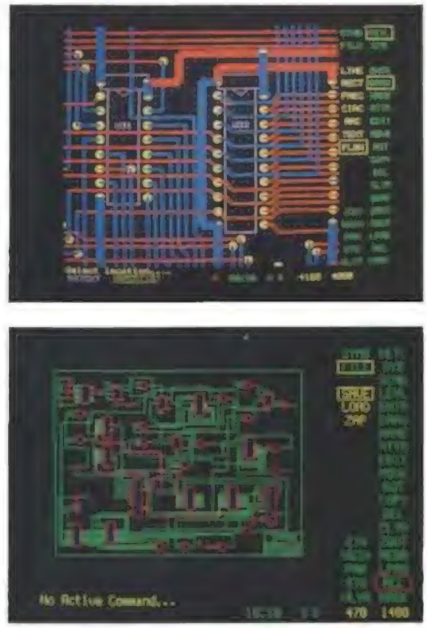
"IBM has gone off and created a whole new industry again," said one attendee of the National Computer Graphics Association (NCGA) show in Dallas. It didn't take much wandering in the aisles to know that the industry he meant is graphics hardware and software for IBM's PC family. Indeed, the dominant machine on the show floor was the IBM PC AT equipped with high-resolution graphics controllers, including IBM's Enhanced Graphics Adapter and Professional Graphics Adapter. As the speakers at the seventh annual meeting on the state of computer graphics unanimously agreed, the AT is becoming the de facto standard for graphics workstations.

The *S. Klein Newsletter on Computer Graphics* says the AT merely quickened the pace of what was already a stampede of graphics software for the PC family. And that increased pace is most noticeable in technical applications, in which the demands of design and graphics software tax even the number-crunching ability of IBM's desktop powerhouse.

Deborah Kelly, former manager of computer-graphics research at the Los Angeles office of the market-research firm International Data Corporation, says there is little need for the AT's extra power to make the analytic graphs that today's business user creates, such as those created on Lotus *1-2-3*.

But Neil Kleinman, president of the consulting firm Pacific Technology Associates of Sherman Oaks, California, notes that users are beginning to enhance such analytic graphs used in presentations. This was the topic of several seminars at the NCGA show. Indeed, Kleinman says, the trend is toward sophisticated presentation graphics derived from large databases, making the IBM PC AT the machine of choice.

"It's also well suited for a dedicated, sophisticated presentation system with a high-quality output device," such as a film recorder, and, in combination with



P-CAD graphics illustrates the simplicity and clarity of PC AT–based interactive design.

low-cost laser printers, as a tool for in-house publishing, Kleinman says.

While Apple positions the Macintosh in just that market niche, the AT is close behind. *PageMaker*—the page layout and design software from Aldus Corporation in Seattle that is a cornerstone of Apple's pitch to corporate graphics departments—is currently under development for the AT.

The biggest impact of the AT's extra power, however, is in the graphics-intensive areas of engineering. Until recently, PC-based drafting was slow and drawing complexity limited, but the AT's high-speed processing and hard-disk storage make it powerful enough for most routine engineering work. According to literature from software vendor Personal CAD Systems of Los Gatos, California, 80 percent of computer-aided electronic engineering can be done on PCs when you throw in the AT for the tougher jobs. The *S. Klein Newsletter* agrees, saying, "High-end software companies who chose not to port their products to the more sluggish XT now offer AT versions."

The advantages of AT-based systems are obvious. Drafting systems based on the AT begin at roughly $10,000, compared with $100,000 or more for minicomputer-based equipment. There is also already a slew of software available. Management Roundtable Inc.'s software directory includes 22 pages listing 100 companies. And the PC's vast library of general-purpose software is a desirable bonus (engineers spend a lot of their time with administrative chores, it seems). The result, according to Strategic Inc., a market-research firm in Cupertino, California, is that there will be 1.5 million PC-based computer-aided design systems by the end of the decade.

That's nothing, however, compared with the growth of the PC-based business-graphics software market. A study released by International Data Corporation (IDC) predicts that just under 10 million systems will be running PC-based business graphics software by the end of the decade. IDC says that last year there were 250,000 such systems.

One reason for this software explosion in business and engineering graphics is IBM's recently announced support for device-independent graphics standards such as the Virtual-Device Interface (VDI) and the Graphical-Kernal System (GKS), which allow a software vendor to write one version of a product and have it work on many different output devices, graphics controllers, and monitors. While there is some hesitation on the part of applications developers because of the speed lost to gain this independence, faster hardware such as the AT and improved VDI software from Graphics Software Systems, a systems-software vendor in Wilsonville, Oregon, eventually should win them over, analysts say. "IBM's blessing of these standards will open the PC market to innovation and exciting new products," the IDC study concludes.

Greg Reznick, product marketing manager for Mouse Systems of Santa Clara, California, sums up the impact of the AT and improved graphics adapters: "With resolution and speed improving, the possibilities of graphics programs have to expand."

—Kevin Streblo

THE GOVERNMENT'S SEARCH FOR A SECURE PC

Your PC has a problem: It can't keep classified data to itself. When personal computers crunch numbers, they emit radio signals that can be tapped and deciphered with the proper listening gear. For example, the March issue of the *Computer Fraud & Security Bulletin* reported that a researcher in The Netherlands set up a simple listening post at a recent conference on computer security and, using widely available electronic test gear, successfully intercepted and decoded computer keystroke signals in another building 400 yards away.

These same radio signals foul reception when a computer is working near a television set. But what is a minor annoyance to a consumer is big trouble for the government, which uses hundreds of PCs to process reams of sensitive data. As a result, personal-computer companies are finding new opportunities in making so-called quiet computers.

JAMIE HOGAN

The government's shield against prying ears is called Tempest, a program administered by the National Security Agency (NSA) to buy quiet hardware for the government, the country's biggest user. In the past two years, the NSA has become aware of the PC's inability to keep a secret and has extended Tempest to include microcomputers.

"There are 2.5 million government employees with security clearances, and 1.5 million contractor employees with security clearances," says Bob Dornan, director of procurement information management services in the Washington, D.C., office of International Data Corporation, a national research firm. "We've projected that we could easily see the requirement for about a half million Tempest workstations of varying types."

The specifics of the Tempest program are well guarded by the NSA, the government arm charged with keeping America's military secrets. In the 1970s, the NSA established NACSIM 5100A, a classified specification for Tempest-approved gear. While the NSA and the companies in the Tempest business will not discuss specifics, the general details of Tempest requirements are known. Computers and related peripherals must be encased in copper, aluminum, or special chemical coatings to block emissions produced by the machines. In the case of personal computers, such shielding can amount to an engineering challenge. It's one thing to shield a mainframe. It's another to shield a portable or desktop computer and maintain the machine's size and weight.

Grid Systems Corporation of Mountain View, California, and Atlantic Research Corporation of Alexandria, Virginia, reengineered Grid's Compass portable computer to meet Tempest specifications, but it was a big job for Grid's engineers, says Barry Margerum, a Grid vice president. "It took us about eight months from start to finish."

Adding shielding also complicates the otherwise-simple matter of repair. "I can take the covers off a normal IBM PC in about 60 seconds," says a Washington technician for Office Technology Plus who preferred not to be named. "On the Tempest version of the machine, it's closer to a one-hour job."

As one might expect, the cost of meeting Tempest standards adds considerably to the PC's price. An IBM PC with floppy-disk drives costs about $2,000. The same machine in Tempest configuration costs $5,995, says Millie Dunn, a spokeswoman for IBM's Federal Systems Division. Grid's Compass costs about $3,300 in its non-Tempest form. The same machine, in a Tempest version, runs about $7,000.

The high costs, however, aren't stopping the government from buying Tempest hardware in growing numbers. In October, Zenith won a $100 million contract to provide Tempest-protected versions of its PC, the Zenith Z-150, to the Navy and Air Force. The machines are used for "everything from word processing to spreadsheets to communications," says Zenith spokeswoman Marilyn Wilcox. When U.S. troops stormed Grenada in 1983, Grid's machines provided secure communication between the Marines and military headquarters in North Carolina. The Grid machines also are popular on the space shuttle and at the IRS, where field agents pack portable computers. "Because our machines are interfaced to radio and encrypting devices, we're giving the military solutions they wouldn't otherwise get," says Grid's Margerum.

As more Tempest hardware is acquired, the price will drop, says IDC's Dornan, and more employees in sensitive government jobs will use quiet personal computers. Then Tempest technology will spread to the commercial sector, such as banks and large corporations, he says. But only buyers with the appropriate security clearances can buy Tempest computers now.

"A 50 to 60 percent incremental increase in cost is still acceptable for most people who process classified information," says Dornan. "One of the real threats is that someone sitting in a parking lot with $500 worth of listening gear is able to capture what is on a PC."

—Edward Jones

TROJAN BUG

Sometimes theoretical research finds practical applications sooner than expected. To the chagrin of a few unethical college students, such was the case in a recent computer-programming course at Harvard University.

Harvard professor of computer science Michael Rabin, a 1976 winner of the Alan Turing Award (computer science's equivalent of the Nobel Prize), developed an algorithm that compares

large files of text. Although the algorithm involves sophisticated mathematical techniques, its basic principle is simple. It takes files of text and uses probabilistic algorithms (employing, in this case, finite fields, an area of algebra) to map each file to a large number.

These numbers are called fingerprints because they identify each file. The program then compares the fingerprints. Files whose fingerprints are identical have a high probability of being identical. A program based on Rabin's theoretical idea can report that files are identical even though trivial changes have been made.

JAMIE HOGAN

When two computer science students at Harvard copied a program written by a friend, they changed such nonessentials as variable names and the documentation that accompanied the code. The cheaters reasoned that they would never be caught because no one person reads the numerous programs written by students. But using Rabin's algorithm, a teaching assistant had written a program to help prevent such chicanery. The program ignored all nonessentials and focused on the structure of the program the students had copied. They were caught.

Rabin's idea can also be useful in protecting the integrity of a large computer system. For example, some disgruntled employee might maliciously change the mainframe code in a corporation's computer system. Unknown to management, the program transfers sensitive information to a competitor or perhaps directs funds to an unauthorized bank account.

Even if this wrongdoing is suspected, the corporation's program is so large and complex that reading it would take weeks. And to compound the difficulties, the original programmer is no

longer with the organization.

By using Rabin's algorithm, the mainframe program, regardless of its size, can be converted quickly to a large number. That number can be kept secret and locked safely away from the computer system. Then it's an easy task to check the original number against the new one. If the numbers are not equal, the program has been altered: the Trojan bug uncovered. This scheme is incorporated in a file-authentication system currently being designed at Harvard.

—Oren Etzioni

THE MESSAGE IS THE MEDIUM

In June software publisher Ashton-Tate, of Culver City, California, issued its second annual report along with a unique accessory—a two-disk package including financial data from the annual report and a 15-minute demonstration of its integrated software program, *Framework*. The disks included 15 detailed charts and additional financial information culled from various Securities and Exchange Commission (SEC) documents. In addition to the 25,000 printed copies of the annual report, 7,500 disk packages were distributed to a select list of PC users.

Ashton-Tate's annual report comes on disk.

"It's pretty creative," says Dave Readerman, securities analyst at Smith Barney in New York, "and an appropriate medium to distribute information for a software company. However, since it won't load directly onto my own spreadsheet program, I would have to input all that data before I could use it. It says that the disks are to be used 'in conjunction with the annual report,' which makes using it complicated. Although they're not there yet, it's a nice start."

The package runs on the IBM PC, PC AT, PC XT, and compatibles and requires 384K of RAM. It is not copy-protected, but it cannot be printed or altered because it reflects the data filed with the SEC (although the disks themselves were not filed).

—Sue Kelly

TAPE BACKUP

Most makers of hard-disk drives hate to mention it, but like other data-storage devices, their systems are subject to occasional failures. With the blink of an eye, the marvelous, floating read/write head that transfers data to and from the hard disk at breathtaking speed can suddenly crash, grinding your data into useless magnetic dust. When dealing with 5, 10, 20, or even more megabytes of data, a hard-disk collapse can inflict a tremendous financial loss on any business.

While floppy-disk users have long known the value of regularly backing up their data, most hard-disk owners have been reluctant to make regular backups. Of course, copying files with a floppy-disk system is a snap. You simply instruct your computer to copy the information on the disk in drive A to the disk in drive B and then store the spare disk. But hard-disk drives, because of

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their cost, size, and complexity, pose special backup problems.

Back in the Stone Age of personal computing, about five years ago, the accepted method of hard-disk backup was to transfer the information to floppy disks. This was no simple task, considering that a modest 5-megabyte hard disk contains enough data to fill more than a dozen standard double-sided floppy disks. In those days, hard-disk users got lots of wrist exercise. A better system was needed, and fortunately, manufacturers of PC peripherals accepted the challenge.

A subindustry has begun to serve the backup needs of hard-disk users. Hawking a wide and sometimes confusing array of products, these vendors promise systems that can make daily backups fast and painless. By far the most popular kind of hard-disk backup system is the quarter-inch streaming-tape cartridge drive. Featuring a removable tape cartridge originally designed by 3M, these units store data at rates of up to 3 megabytes per minute.

Cipher Data Products' tape drive

Virtually all of the systems allow you to back up a single file or an entire disk. And like any magnetic-based storage medium, each cartridge can be reused an almost infinite number of times. Prices of quarter-inch drives vary widely depending on the storage capacity and speed of the unit. The average 10-megabyte unit retails for about $1,500. Higher capacity drives are priced slightly higher. You can get a small break on cost if you purchase a hard-disk drive with a built-in tape unit. The data cartridges sell for less than $50 each.

Well-known makers of quarter-inch drives include Cipher Data Products (10101 Old Grove Rd., San Diego, CA 92131, 619-578-9100), Tallgrass Technologies Corporation (11100 West 82nd St., Overland Park, KS 66214, 913-492-6002), and Sysgen Inc. (47853 Warm Springs Blvd., Fremont, CA 94539, 415-490-6770).

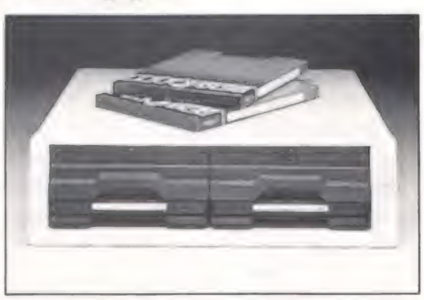
Sigma Designs Inc. (2023 O'Toole

Tallgrass Technologies' tape drive

Ave., San Jose, CA 95131, 408-943-9480) has recently released a $995, 10-megabyte, quarter-inch portable tape drive for the IBM PC and compatible computers. According to the manufacturer, the drive is compatible with industry-standard floppy-disk interfaces, eliminating the need for another board, or controller card. While quarter-inch cartridge drives currently lead the backup pack, a number of manufacturers are experimenting with alternative storage systems. For example, Corvus Systems (2200 Corvus Dr., San Jose, CA 95124, 408-559-7000) has developed a $790 unit that lets Corvus hard-disk owners transfer data onto ordinary, inexpensive videocassettes.

The 3M company (3M Center, Building 225-5N-04, St. Paul, MN 55144, 612-733-7334) recently unveiled a 0.15-inch minicartridge that it hopes will inspire manufacturers to develop smaller, more power-efficient tape drives for portable and small desktop computers. Another alternative is the popular Bernoulli Box, a unit that uses floppy-disk-like, removable data cartridges to store up to 20 megabytes of data—the device simultaneously accepts two 10-megabyte cartridges. Although the $2,995 drive is marketed mostly as a primary data-storage system, a growing number of hard-disk users are finding the Bernoulli Box an attractive, if somewhat costly, high-speed backup resource.

"We're aware that many buyers are using the system for hard-disk backup," says Steve Powell, executive assistant at Iomega Corporation (1843 West 4000 South, Roy, UT 84067, 801-778-1000), the company that manufactures the Bernoulli Box. "We can understand why. Our system beats tape units in both access and data-transfer time," Powell claims. "We beat the pants off of 20-megabyte tape drives in the random-access mode, and for the user who regards time as a critical factor, the extra cost is negligible."



Iomega's Bernoulli Box

Regardless of the format involved, the PC-owning public is apparently taking backup units to heart. Bill Frank, a senior vice president with InfoCorp, a market-research firm in Cupertino, California, says that almost 750,000 tape drives were sold in 1984. This year the number is expected to jump to about 1.2 million units. The future looks equally bright. Dave Vellante, an analyst with International Data Corporation, a Framingham, Massachusetts, research firm, says the tape-drive industry is "definitely looking up."

Sigma Design's 10-megabyte tape drive

Vellante says his firm's research indicates that by 1989, tape units will account for 10 percent of all PC mass-storage sales. Tape drives currently constitute 2 percent of the market.

While this gain sounds optimistic, at least one industry observer feels that the days of tape backup systems are numbered. "I think that hard disks themselves may eventually become the preferred method of backing up hard disks," claims Tim Bajarin, vice president of Creative Strategies, a San Jose, California, research firm.

"The prices may not be quite low enough yet, but it's getting very close. We may get to the point where hard-disk drives become cheap enough so that even relatively small-scale users will start running dual hard-drive systems, just as floppy-disk users commonly run two drives," he says. "At that point, the game could be over for the tape vendors."

Another threat to tape-drive manufacturers comes from Japan, where Sony, Toshiba, Hitachi, and Matsushita are developing read/write optical disks that they claim can hold from 500 to 1,800 megabytes of data. According to industry reports, the disks under development would be removable and competitively priced with current hard-disk drives. While such disks and drives are at least a year or two away from the market, the devices could provide tape-drive makers with some tough competition in the years ahead.

"If the prices are right, the optical systems could just flat out devastate a segment of the tape manufacturers' business," says Frank of InfoCorp. "With that sort of capacity and removable disks, who would need a tape drive?"

—John Edwards

Sysgen Inc.'s quarter-inch tape drive

DIGITAL TV ADDS BELLS AND WHISTLES

Once upon a time, every toothpaste and breath mint in America had to contain chlorophyll—the green wonder ingredient—in order to sell. Today it seems that every consumer-electronics product has to be digital to get an audience in the high-tech age.

The latest gadget to go digital, following on the heels of the digital-audio compact disc player and digital-ready loudspeakers, is the digital TV set—a revamped machine that uses chips to digitally process video bandwidth information. At last January's Consumer Electronics Show in Las Vegas, at least three television manufacturers exhibited digital TVs, while the rest of the industry nervously issued plans to follow suit.

The first digital TV to hit retail shelves in the United States was a Toshiba model in March. The set, which carries a retail ticket of $1,300, is deluxe all the way: 20-inch (diagonal) square-cornered picture tube, full stereo sound from a stereo source, 32-key remote-control pad. Digitally speaking, the TV can do two things ordinary sets can't do. First, when hooked up to a second video source like a VCR or computer, it can superimpose one picture in the corner of another. This picture-in-picture (PIP) capability is flexible. The small inset picture can be viewed in two sizes: one-fourth or one-sixteenth of the larger picture. It can also be placed in any one of the four corners of the TV screen, and by pressing a button, the larger picture can become the inset image and vice versa.

The second notable feature of the Toshiba digital set is the ability to freeze the image of the inset picture. When the freeze function is turned off, the inset picture picks up at real time.

The Toshiba model has two RGB inputs: one for a teletext or videotext decoder; the other, an eight-pin plug for home computers. An available adapter cable allows the IBM PC to be attached to the set. This way, presumably, frazzled consumers can work on their tax spreadsheets while silently monitoring a basketball game on the TV's inset picture.

Close on the heels of Toshiba are two other Japanese companies, Panasonic and Sony. The Panasonic digital TV is similar to the Toshiba unit. It features a 20-inch data-grade picture tube (capable of 80-column-by-25-line text display), PIP capability—though the inset picture only comes in a six-inch diagonal size—and freeze frame, all for $1,200 list and perhaps $999 on the street. The Panasonic unit also has two RGB inputs: one for an outboard teletext decoder, the other for direct interface with the IBM PC, IBM PCjr, and Apple III. The Apple IIe and IIc may be connected to the TV via an available adapter cable.

"Digital lets you do some of those picture enhancements like freeze frame and windowing, but there's nothing in today's digital TV that's going to make a much better picture," says Henry Kloss, president of Kloss Video, a projection-TV manufacturer based in Massachusetts. "As far as windowing goes, I think it's much less expensive to buy a little TV and have it there to monitor a second channel if you want to."

Using digital technology to improve the television picture is possible given present technology, although it is expensive. Last year two researchers from Phillips Labs in New York demonstrated an enhanced digital TV prototype that was capable of storing a large amount of picture memory. The memory circuit enabled the TV to take a standard NTSC signal—525 lines transmitted 30 times per second—and improve the clarity to 525 lines 60 times per second. Side benefits of this evolutional digital approach were the elimination of unwanted artifacts, such as cross-color and noise, and the familiar PIP.

The improved picture of the enhanced digital TV is entirely due to making the home TV set more brainy. Combine that with improvements at the other end of the pipeline—wider bandwidth transmission—and you've got

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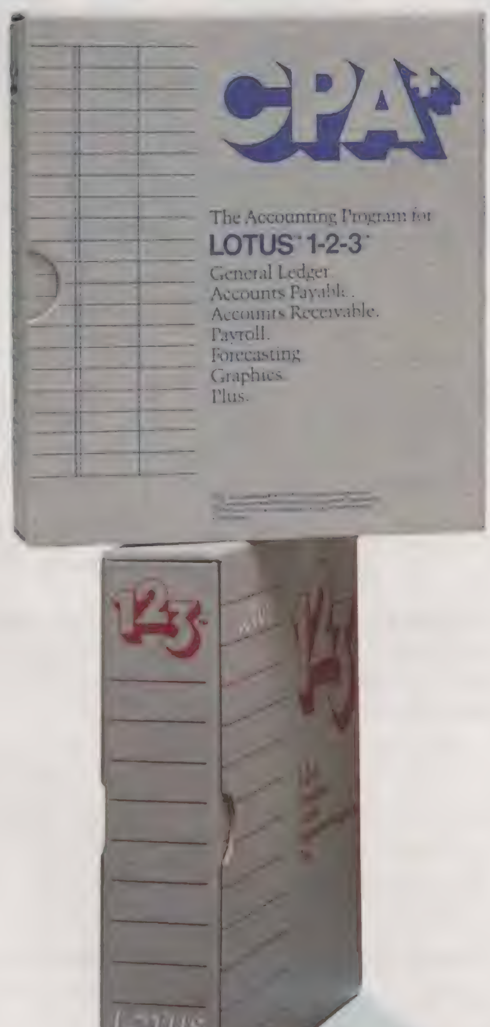

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high-definition TV (HDTV), the holy grail of videophiles.

Most early proposals for HDTV centered on the use of direct-to-home satellite broadcasts of a wide video bandwidth that would result in an excess of 1,000 lines of picture resolution. In short, a more powerful transmission method would produce pictures on smart TV that came close to 35-mm camera sharpness. But as the future of direct broadcast satellite services is now in doubt, several systems for earthbound HDTV have been proposed. One demonstrated by CBS Labs is compatible with current 525-line broadcasting.

The trick of the CBS approach is to use two adjacent UHF channels for picture transmission. One channel transmits a 525-line picture, receivable by an

JAMIE HOGAN

ordinary TV. The second channel transmits additional video information for an HDTV wide-screen image. A proposed HDTV receiver with digital innards would latch onto both channels for a 1,050-line picture.

The FCC appears hospitable to the idea of adjacent channel UHF broadcasting, and Renville McCann, a vice president at the CBS Technology Center, says CBS will be mounting experimental HDTV transmissions within the next five years.

Now, if only the engineers can get the networks to improve programming.

—*Carl S. Kaplan*

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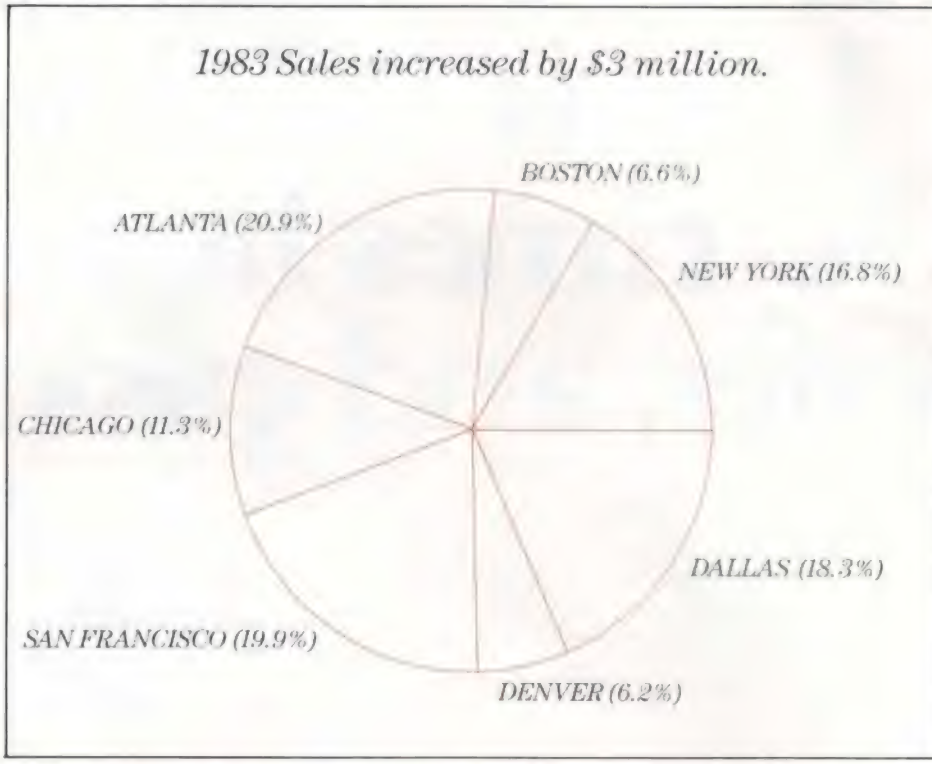

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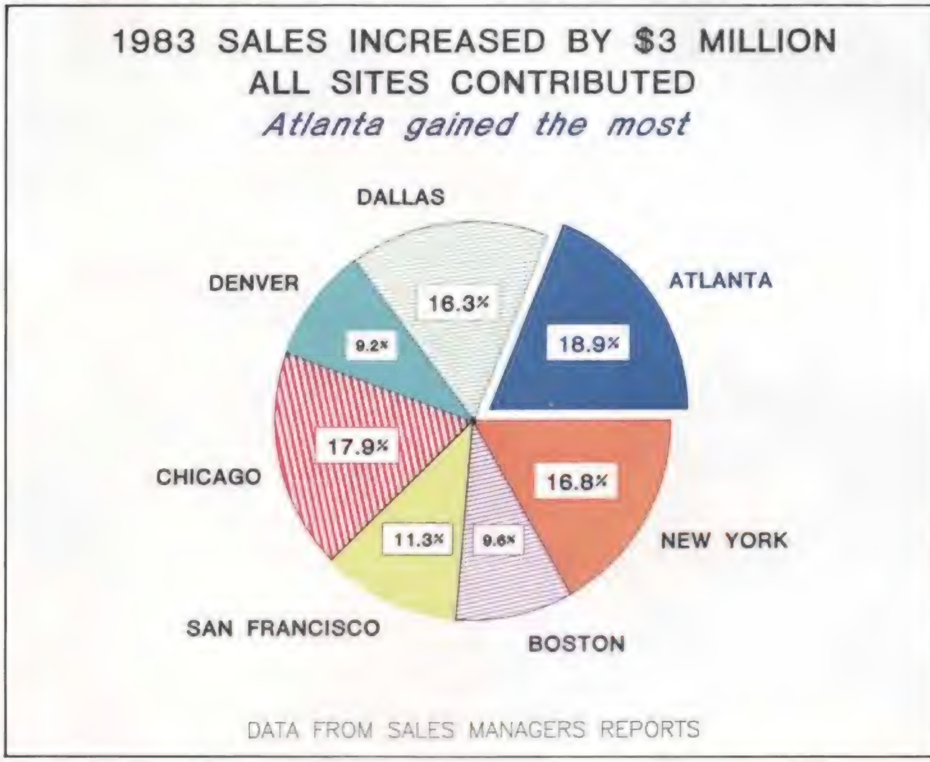

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DATA-ENTRY ROUTINES

This collection of *1-2-3* macro techniques can help you put data into your worksheet.

BY DANIEL GASTEIGER

Most of your work with *1-2-3* probably involves putting data into the worksheet, manipulating and comparing data, and getting data out of the worksheet. This month we'll talk about ways that macros can ease the data-entry process.

We discussed a simple data-entry macro in the *1-2-3* macro column in the May issue. It looks like this:

	A	B	C	D	E	F
1	\m	{?}				
2		{DOWN}				
3		/XG\m~				

You enter the label *\m* into cell A1 by pointing to that cell and typing '*\m*. Without the apostrophe, *1-2-3* displays the letter *m* repeated across the width of the cell. Assign *\m* as the macro name by pointing to cell A1, issuing the /Range Name Labels Right command, and pressing Return.

This macro is indispensable for entering long columns of data. Press Alt-M, and move to the top of the column that you want to fill. Then start typing, and press Return after each entry. The cell pointer moves down automatically. If you wish to move around on the worksheet (to the top of the next column, for instance), simply press the appropriate arrow keys. The macro continues working until you stop it by holding down the Control key and pressing Break.

If you replace the {DOWN} command with the {RIGHT} command, the macro automatically moves the cell pointer to the right after you make each entry:

	A	B	C	D	E	F
1	\m	{?}				
2		{RIGHT}				
3		/XG\m~				

DATA ENTRY ON A STRUCTURED WORKSHEET

Some worksheets contain hundreds of values and formulas tied together to produce a collection of results. You can make the results rely on data in just a few cells of the worksheet and vary the values in those cells to compare the outcome of different scenarios.

Daniel Gasteiger is the Macro Department Editor for LOTUS.

Below is a worksheet that calculates the duration of a trip and the amount of gas a car will use based on the distance you enter in the cell named *distance* (B1).

	A	B	C	D	E	F
1	distance					
2						
3	mph	55				
4	mpg	26.5				
5						
6	duration:	+distance/mph				
7	gas	+distance/mpg				

Ordinarily, I wouldn't write a macro to control data entry for this tiny model, but you can apply the technique to larger models that require the input of several variables. With recalculation set to manual (/Worksheet Global Recalculation Manual), a data-entry macro might look like this:

	A	B	C	D	E	F
9	\m	/XNHow far are you traveling? ~distance~				
10		{CALC}				

When you run the macro by pressing Alt-M, here's what happens:

/XNHow far are you traveling? ~distance~ Causes *1-2-3* to display the prompt *How far are you traveling?* in the control panel. Enter the number of miles and press Return; the number appears in the cell named *distance*. If you enter a label, *1-2-3* displays the error message *Illegal number input* in the lower-left corner of your screen. Clear the error by pressing Escape, and reenter the value. Be aware that if you enter a cell address, *1-2-3* places the value of that cell into the target cell.

{CALC} Causes *1-2-3* to recalculate the worksheet and, therefore, to update the values of the cells named *duration* and *gas*.

If you want to enter label entries, such as a person's name or a street address, you can write a macro using the /XL command:

	A	B	C	D	E	F
1	\m	/XLEnter name ~name~				
2		/XLEnter street ~street~				

The /XL command works like the /XN command, except that it places a label-prefix character in front of whatever you enter in response to the prompt it displays. Words, numbers, and number-letter combinations are stored as labels in the target cell exactly as you type them. The macro shown consists of two steps excerpted from a longer macro. Remember to assign the range names *name* and *street* to cells elsewhere on the worksheet before running the macro. Here's how the macro works:

/XLEnter name ~name~ Displays the prompt *Enter name* in the control panel. When you type something and press Return, the characters you type are stored in the cell named *name*. If you respond to the prompt by pressing Escape, your macro stops running.

/XLEnter street ~street~ Displays the prompt *Enter street* and places your response into the cell named *street*.

FILL-IN-THE-BLANKS DATA-ENTRY FORMS

Another way to expedite data entry is to create fill-in-the-blanks entry forms. The /Range Input command in *1-2-3* is ideal for this purpose. While /Range Input is active, you can move the cell pointer only to unprotected cells within a specified range.

Create the following worksheet, then unprotect cells B1..B5 by placing the cell pointer on cell B1 and pressing slash (/), selecting Range Unprotect, and pressing the down arrow key four times, finishing with Return.

	A	B	C	D	E	F
1	Name:					
2	Street:					
3	City:					
4	State:					
5	Zip:					

Press /, select Range Input, and indicate the range A1..D6. When you press Return, the cell pointer jumps to the first unprotected cell in the range (cell B1). When you repeatedly press the down arrow key, the cell pointer moves to cells B2, B3, B4, and B5 as usual, but then it jumps back to B1 instead of moving into cell B6. Pressing the right arrow key repeatedly produces similar results. Pressing the up arrow or left arrow key reverses the action. You are locked into the unprotected cells. Within these cells, *1-2-3* allows you to use only arrow keys and the standard typewriter keys to enter data and edit entries; you cannot access the menu or use the function keys, with the exception of EDIT and HELP. To break out of Range Input, first be sure you have not previously typed something that has yet to be entered into the current cell, then press Escape or Return.

Range Input works even if the unprotected cells in the input range are not adjacent to each other. In the following worksheet, cells A2, A4, A6, B6, and C6 are unprotected. Using a Range Input command identical

to the one used above restricts movement of the cell pointer to these cells:

	A	B	C	D	E	F
1	Name					
2						
3	Street					
4						
5	City	State	Zip			
6						

When a macro reaches a /Range Input command, it locks you into the Input range until you break out of Range Input by pressing Return or Escape. Once you do this, the macro processes any commands that follow the Range Input command.

WHAT HAPPENS TO THE DATA?

A data-entry routine often needs to do more than let you enter values or labels into the worksheet. In many cases, a fill-in-the-blanks form like the one shown above represents a single record in a database. Ideally, your macro allows you to enter a record, places the data into a database, and lets you enter a new record, ad infinitum.

As with most macros, there are many possible methods of accomplishing this. One simple approach is to set up your database as follows, assigning the range name *dbase* (using the /Range Name Create command) to the row containing column headers (G1..K1) and the range name *bottom* to the cell containing the label "bottom" (G2):

	G	H	I	J	K	L
1	Name	Street	City	State	Zip	
2	bottom					

Create a fill-in-the-blanks form as follows:

	A	B	C	D	E	F
1	Name	Street	City	State	Zip	
2						

Adjust the column widths to accommodate the largest entries you are likely to make. We've reduced the widths in this illustration to fit the page. Assign the name *inprange* to cells A2..E2 and unprotect that range by issuing the /Range Unprotect command, typing *inprange*, and pressing Return. Assign the name *form* to the range A1..E2. Now enter the following macro:

	A	B	C	D	E	F
9	\i	/RIform~				
10		{GOTO}bottom~				
11		/M~{DOWN}~				
12		/Cinprange~~				
13		/RNCdbase~{DOWN}~				
14		/RPdbase~				
15		/REinprange~				
16		/XG\i~				

Finally, assign the database Input range by issuing the /Data Query Input command, and entering *dbase*. Elsewhere on the worksheet, you can create Criterion and Output ranges for use in Data Query Find, Extract, Unique, and Delete operations.

Assign \i as the macro name by going to cell A9, issuing the /Range Name Labels Right command, and pressing Return. This allows you to start the macro by pressing Alt-I. Here's what happens:

/RIform~ Activates Range Input, locking you into the unprotected cells in the range named *form*. You enter data, using the arrow keys to navigate between cells, and press Return twice when you finish typing your last entry. The first Return enters data into the cell; the second ends the Range Input command, allowing the macro to continue with the commands that follow.

{GOTO}bottom~ Sends the cell pointer to the cell named *bottom*—the cell at the bottom of your database.

/M~{DOWN}~ Moves the contents of the current cell (*bottom*) down to make room for the new data.

/Cinprange~~ Copies the entries you have just typed from *inprange* to the current row.

/RNCdbase~{DOWN}~ Expands the range named *dbase* downward one row to include the new row of data. This automatically adjusts the Data Query Input range to include the entire database.

/RPdbase~ Protects the range named *dbase*. This step is included because the macro copies unprotected cells into the database. If you use this data-entry routine as part of a larger macro application, this step lets you include /Worksheet Global Protection Enable and Disable commands in the macro to protect the data in the database.

/REinprange~ Erases the range named *inprange* so the cells are empty when you start the next Range Input command.

/XG\i~ Sends the macro to process keystrokes in the cell named *\i*, which is the first cell of the macro. You are ready to enter the next record for your database. Because this is an infinite loop macro, it will continue running until you stop it by holding down the Control key and pressing Break.

You can use these techniques to create data-entry routines for any *1-2-3* application. Decide what approach best suits your own work habits and put together an appropriate macro. You'll discover how these techniques speed up your data-entry chores.

LETTERS TO THE MACRO EDITOR

LOCATING BLANK CELLS AND CREATING FOR-NEXT LOOPS

Q. I have two questions about *1-2-3* macros. Is there a simple macro that locates the next blank cell in a column of data (numbers, formulas, or labels)? Second, can *1-2-3* simulate the action of a For-Next loop?

Mike Freeman
Tecmark Computer Services
Vancouver, Washington

A. I can't think of a simple macro that locates the next blank cell in a column of data no matter how the data is distributed. The following, rather complex macro finds the next blank cell. This is the simplest macro I could devise that works in almost every case. It doesn't work if you have placed data in the last column of the worksheet, even if you may later have erased that data:

	A	B	C	D	E	F
1	`\m`	`{DOWN}`				
2		`/WIC~`				
3	`loop`	`/RNChere~{RIGHT}~`				
4		`/XI(@COUNT(here)=0)~/XGend~`				
5		`/RNDhere~`				
6		`{DOWN}`				
7		`/XGloop~`				
8						
9	`end`	`/RNDhere~`				
10		`/WDC~`				

Assign the range names *\m, loop*, and *end* by first placing the cell pointer on the cell containing the label *\m*, issuing the /Range Name Labels Right command, and pressing End Down End Down Return. To use the macro, place the cell pointer on the first cell of the column to be evaluated and press Alt-M.

The July *1-2-3* Macro column presented a macro that uses the /Data Fill command to simulate a For-Next loop. A For-Next loop is a series of commands that are repeated a finite number of times before the macro either stops or moves on to another series of commands. In *1-2-3* you can control such a loop by arranging the macro commands as follows:

	A	B	C	D	E	F
1	`\m`	`/REcounter~`				
2	`loop`	`   macro steps...`				
3						
4						
5		`/DFcounter~counter+1~~~`				
6		`/XI(counter>=targ)~/XQ`				
7		`/XGloop~`				
8						
9	`targ`	`3`				
10	`counter`					

Assign the range names *\m, loop, targ*, and *counter* using the /Range Name Labels Right command. The loop begins in the cell named *loop* and ends with the command /XGloop~. In the cell named *targ*, indicate the number of times the loop should repeat. Each time the macro completes the loop, the value in the cell named *counter* increases. When *targ* and *counter* are equal, the macro stops.

SUBROUTINES IN BASIC FOR 1-2-3 MACROS?

Q. Can you call a subroutine written in BASIC from within a *1-2-3* macro?

Greg Roberts
Mallinckrodt Inc.
St. Louis, Missouri

A. I am not aware of a way to call BASIC programs from within *1-2-3*. Perhaps other readers have developed ways to do this and would like to share them with us.

REPLACING ERR WITH NA

Q. I have a set of formulas that rely on data I enter into columns on my worksheet. Each week I update the worksheet and put a zero into cells for which no data exists. Formulas relying on these cells evaluate to ERR. How can I create a macro to substitute NA for each ERR message, to print the report, and finally to re-create the original formula?

Phillip Castro
Nationwide Insurance
Walnut Creek, California

A. You need not write a macro to solve this problem. Instead, rewrite the formulas using the @IF and @NA functions. Columns A and B of the following worksheet contain numbers, and column C contains the formula +A1/B1 copied down the length of the column. Copy the following formula down the length of column D: @IF(@ISERR(A1/B1),@NA, A1/B1).

	A	B	C	D	E	F
1	12	3	4	4		
2	10	0	ERR	NA		
3	0	2	0	0		
4	15	5	3	3		
5	8	0	ERR	NA		

The formula in cell D1 means "If the formula +A1/B1 evaluates to ERR, show the value NA; otherwise, show the value of +A1/B1."

@ERR IN JUNE MACROS?

Several readers have written with regard to the date-stamp macro described in the June *1-2-3* Macro column. They have pointed out that the proper command sequence for converting formulas to values is {EDIT}{CALC}~ and that the macro should have read:

	A	B	C	D	E	F
11	\n	@TODAY				
12		{EDIT}{CALC}~				
13		/RFD1~				
14		/WCS10~				

When *1-2-3* is in Value mode (the word VALUE shows in the status indicator in the top-right of the screen), pressing the CALC key produces the same results as pressing the CALC key while *1-2-3* is in Edit mode. The {EDIT} command in this macro is not necessary.

USING /DATA QUERY FIND IN A MACRO

Q. While using the /Data Query Find command in a macro, I have found that if I don't put a {?} command after the Quit command, the record found displays for only a moment before the macro resumes control. Why is this?

James Ghrist
Black and Veatch International
Kansas City, Missouri

A. I suspect there is a typographical error in the printout of the macro you sent to me. The code (excerpted from a larger macro) reads:

	A	B	C	D	E	F
4		/DQ~Cfind~F				
5		Q{?}				
6		/XMmenu~				

Assuming that *find* is the name of the Criterion range, the entry in cell B4 is missing the name of an Input range—something *1-2-3* is looking for after it processes the /DQ~ sequence in that cell. The following is the macro rewritten using *dbase* as the name for the Input range and including commands to have the macro pause after it has found the matching record in the database. To get the macro to continue running after it pauses, press Return.

	A	B	C	D	E	F
4		/DQIdbase~Cfind~				
5		F{?}~Q				
6		/XMmenu~				

Some Useful Conventions

Our examples use uppercase letters for macro commands and lowercase letters for range names and cell addresses used by the macros (/XGaddress~). Wherever possible, range names appear to the left of the named cells. This helps to identify named cells and is especially useful if you want to use the /File Combine command to copy a macro from one worksheet into another. You can reassign all the range names in one step using the /Range Name Labels Right command sequence.

Remember, when you enter macro steps that start with a slash (/), a label-prefix character such as backslash (\), or any arithmetic operators (+, −, *, etc.), place an apostrophe (') before the entry or you may get unexpected results.

Why Use Range Names?

When you type a command as a label, cell references within the command are meaningless to *1-2-3* until it processes the macro. For example, if your macro uses the command /Cb3~h20~ to copy information from a table and you move the table to another part of the worksheet, your macro no longer copies the proper information. If, however, you have named the cells *source* and *destination* and the macro command is /Csource~destination~, moving the table containing these cells does not adversely affect the macro. If while writing a macro you need to rearrange your worksheet, you'll be much happier if you've used range names instead of cell references in your macro code.—*D.G.*

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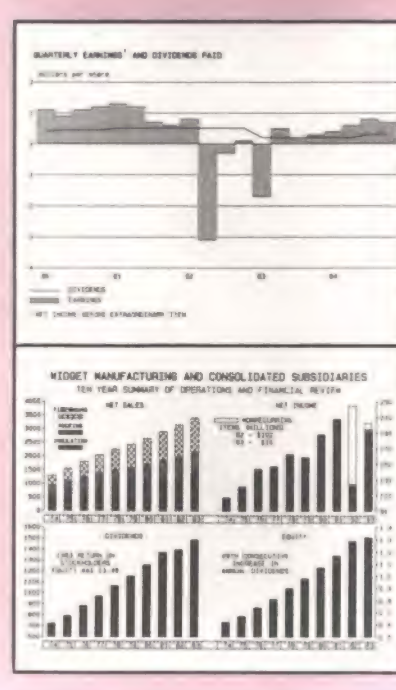

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SYMPHONY MACROS

MAKING MENUS WITH SYMPHONY

Techniques you can use to let other users decide which path your macro should follow

BY DANIEL GASTEIGER

When you create applications, there may be times when you want your macros to give you, or whoever is using them, a choice from a list of options—the same sort of options you have when you press the MENU or SERVICES key. This list of options is called a menu. This month we'll look at some of the ways you can use macros to create custom menus.

The *Symphony* Command Language {MENUBRANCH} and {MENUCALL} commands allow you to create *Symphony*-like menus. These commands work similarly in that each displays a menu in the control panel. The following macro displays a menu that lets you choose whether or not to save the current worksheet as a file named EXAMPLE, even if you have already saved the worksheet using a different file name.

```
Don't save
No  Yes
```

	A	B	C
1	\e	{MENUBRANCH menu1}	
2			
3	menu1	No	Yes
4		Don't save	Save the worksheet
5			{SERVICES}FS{ESC}example~Y{ESC}

Name cell B1 *\e* and cell B3 *menu1* by issuing the MENU Range Name Labels Right command. When you press Alt-E, here's what happens:

{MENUBRANCH menu1} Causes the macro to create a menu based upon the instructions contained in the range named *menu1*. The macro uses the first row of labels in the range (cells B3 and C3) as the menu choices. It uses the second row of labels (cells B4 and C4) as long prompts for the menu. These are descriptive phrases that appear in the control panel when you use the menu pointer to highlight a selection.

In this example, the long prompt for No is *Don't save* and the long prompt for Yes is *Save the worksheet*. When you make a selection, either by pointing and pressing Return or by typing the first letter of the menu choice, the macro processes commands found in the cell directly under the label containing the long prompt for that choice. If you select No from the menu in this example, the macro stops because there are no macro commands in cell B5. If you select Yes, the macro processes the following commands, which are in cell C5.

{SERVICES}FS{ESC}example~Y{ESC} Selects SERVICES File Save and assigns the file name EXAMPLE. If the disk already contains a file with this name, the current worksheet overwrites the one on the disk. Although this is not a particularly useful macro, it does illustrate the {MENUBRANCH} command.

Using the {MENUBRANCH} command, you may create a menu containing several choices that begin with the same letter:

```
Replace contents of the current cell
Replace  Search  Save  Quit
```

	A	B	C	D	E
1					

However, if you type an *S* to make your selection from the menu, *Symphony* assumes that you selected Search. When you make a selection from a user-defined menu by typing the first letter of the menu choice, *Symphony* uses the leftmost choice that begins with that letter. The only way to select Save from the menu shown is to use the arrow keys or space bar to point to the choice and then press Return. To insure that your menus work as *Symphony*'s menus do, avoid using the same letter to begin two or more choices.

With one exception, the {MENUCALL} command is identical to the {MENUBRANCH} command. When *Symphony* encounters a {MENUBRANCH} command, it processes the menu instructions and follows the path the user selects until it encounters the first cell that does not contain a label; then the macro stops. After processing a {MENUCALL} menu, *Symphony* follows the selected path until it encounters a cell that does not contain a label. It then returns to the command following the {MENUCALL} to continue processing keystrokes.

A BIT OF ETIQUETTE

The structure of {MENUBRANCH} and {MENUCALL} menus can lead to some very confusing worksheets. The worksheet below contains one {MENUBRANCH} statement, the instructions for creating the menu, and some of the macro steps associated with each menu

Daniel Gasteiger is the Macro Department Editor for LOTUS.

choice. This is only an illustration; it is not a complete macro:

```
     A       B         C         D
1   \m      {MENUBRANCH choices}
2
3   choices Input    Copy     Reset
4           Enter datPut data Clear all variables
5           {BLANK co{MENU}IRa{BLANK var1}
6           {GOTO}col{MENU}RNL{LET count,1}
7           {DOWN}   {MENU}Cin{IF dat>10}{BRANCH skip}
```

Even on the worksheet, this can be difficult to decipher. Instead of writing all the steps for each menu choice directly under the corresponding long prompt, use {BRANCH} statements to make the macro easier to read. The following is the same menu using {BRANCH} statements to direct the macro to appropriate routines on the worksheet. (This example isn't complete. I have omitted several lines of macro instructions within each *rout* routine.)

```
     A        B              C              D
1   \m       {MENUBRANCH choices}
2
3   choices  Input          Copy           Reset
4            Enter data intPut data into Clear variables
5            {BRANCH rout1}{BRANCH rout2}{BRANCH rout3}
6
7   rout1    {BLANK colm1}
8            {GOTO}colm1~
9            {DOWN}
- - - - - - - - - - - - - - - - - - - - - - - - - -
18  rout2    {MENU}IRabove~
19           {MENU}RNLUabove~
20           {MENU}Cinputrow~above~
- - - - - - - - - - - - - - - - - - - - - - - - - -
35  rout3    {BLANK var1}
36           {LET count,1}
37           {IF dat>10}{BRANCH skip}
```

The command after each long prompt in the menu instructions is a {BRANCH} statement. If you select Input from the menu that this macro generates, the macro looks for instructions in the cell named *rout1*. If you select Copy, the macro processes instructions in the cell named *rout2*, and if you select Reset, the macro continues with *rout3*. Laying out your macros like this makes them easier to read because long commands don't get buried behind commands in adjacent cells. This layout also enables you to identify named cells quickly. For more thoughts on this approach, take a look at "Writing Structured Macros," a feature article in this issue.

HANDLING ESCAPE IN MENUS

When you press the Escape key in response to a regular *Symphony* menu, you move one step back along the command sequence you followed to arrive at the menu. If you had pressed only the SERVICES key and then pressed Escape, *Symphony* would return to Ready mode. If you had selected SERVICES File and then pressed Escape, *Symphony* would return you to the SERVICES menu; pressing Escape again would return *Symphony* to Ready mode.

If you press Escape in response to a user-defined menu, the macro continues processing the command found immediately after the {MENUBRANCH} or {MENUCALL} command. This feature lets you create layered menu systems like those of *Symphony*.

The following is an incomplete macro, part of which illustrates a two-level menu.

```
     A        B                      C
1   \m       {MENUBRANCH menmn}
2
3   menmn    Print                  Save
4            Create report          Save the worksheet
5            {BRANCH print}         {BRANCH save}
6
7   print    {MENUBRANCH prnmenu}
8            {BRANCH \m}
9
10  prnmenu  Pause                  No pause
11           Pause for new pages    Continuous feed
```

So far, this macro does nothing but generate menus. The range names *\m, menmn, print,* and *prnmenu* are assigned to cells B1, B3, B7, and B10, respectively. When you press Alt-M, you are presented with the menu named *menmn*:

```
Create report
Print  Save
     A        B                      C
1   \m       {MENUBRANCH menmn}
```

If you press the Escape key in response to this menu, the macro stops running because there are no further macro instructions following the first {MENUBRANCH} command. Selecting Print causes *Symphony* to display the menu named *prnmenu*:

```
Pause for new pages
Pause  No pause
     A        B                      C
1   \m       {MENUBRANCH menmn}
```

If you press Escape in response to this second menu, the macro processes the command after the second {MENUBRANCH} statement. That command, in cell B8, is {BRANCH \m}. This sends the macro looking for keystrokes to the cell named *\m*—the first {MENUBRANCH} command. *Symphony* once again displays the first menu. You have backed up one level. Pressing Escape a second time stops the macro.

Be careful when designing macros that contain user-defined menus. If your macro uses the {BREAKOFF} command to keep users from "exploring" the worksheet, a {MENUBRANCH} or {MENUCALL} statement can help them beat that protection. If you don't include a command to reroute the macro, pressing Escape at a menu turns the user loose on your worksheet.

IS THIS THE ONLY WAY?

The *Symphony* {MENUBRANCH} and {MENUCALL} commands let you create powerful *Symphony*-like menus. With a little care, you can use them to lead other users through applications you develop. Although powerful,

these menus are not appropriate for every application. They are limited to eight selections per menu, and they aren't easily adapted for selecting items from lists that vary in length from day to day. Next month we'll look at some techniques you can use to create different types of menus for your macro applications.

LETTERS TO THE MACRO EDITOR

PRINTING MULTIPLE FILES

Q. Is it possible to create a *Symphony* macro that prints all the files on a disk?

Melissa Becker
Fuddruckers Inc
San Antonio, Texas

A. An upcoming *Symphony* macro column will present an in-depth examination of some techniques you can use to accomplish this. Since it is a lengthy topic, here are just a few suggestions to get you started.

One approach is to create the macro on an otherwise blank worksheet. The macro should repeat the following operations once for each file on the disk: Combine one of the files into the current file using the SERVICES File Combine command. Print the combined data. Erase the data from the worksheet.

If your files are designed with similar dimensions and data, your macro can be quite simple; that is, you could combine worksheets into a named range, print the range, and erase the range by using the {BLANK} command. If, however, your worksheets are dissimilar, your macro should include instructions that reset the Print settings Source range to accommodate each set of combined data.

A second solution involves creating a macro on each worksheet to print the appropriate range of the worksheet. Each macro should end with a command to retrieve the next file from the disk, and each should be made to start running automatically when you load the file. Do this by pressing SERVICES, selecting Settings Auto-execute Set, and entering the name of the print macro.

If you are using *Symphony* Release 1.1, you can create a macro in Hyperspace (the *Symphony* Macro Library Manager) that prints all the files on a disk. This macro should include the SERVICES File Retrieve command paired with a SERVICES Print Align Go Page-Advance Quit command sequence. Hyperspace preserves macros, even when you erase or retrieve worksheets.

We discussed Hyperspace in the July *Symphony* Macros column. If you are a registered *Symphony* user, you'll be receiving details from Lotus Development Corporation about obtaining an upgrade from your current copy of *Symphony*.

PROBLEMS WITH SYMPHONY WORD PROCESSING

Q. I set up a spreadsheet like the one described in the June *Symphony* Macros column. Everything seemed fine until I tried to type a letter. I typed the date and got the following error message: *Not enough room in Restrict Range*. I couldn't type anymore, and all other functions seemed to halt. When I saved this file on disk, the computer stopped in the middle of the run for a few seconds before completing the save. What's the problem?

David Durning
Kentwood, Michigan

A. The first symptom you describe indicates that column C of your worksheet contained data before you ran the macro. If cell C1 is empty and any other cell of column C contains data, you will not be able to type in the new window once the macro stops. The second symptom is probably related to the first. The long pause saving suggests that your worksheet contains a large amount of data. This might happen if a cell near the bottom of column C contained data.

You can probably eliminate both symptoms if you retrieve the file you have saved and resave only the top-left corner of the worksheet (the first 40 or so rows of columns A and B). Use the SERVICES File Xtract Formulas command, and indicate the file name you used to save the original file. This replaces the original worksheet with a smaller version. When you retrieve the new file, your macros should work without a hitch. ■

Some Useful Conventions

Our examples use uppercase letters for macro commands and lowercase letters for range names and cell addresses used by macros ({BRANCH input}). Whenever possible, range names appear to the left of the named cells. This helps to identify named cells. Remember, when you enter macro steps that start with a slash (/), a label prefix character such as backslash (\), or any arithmetic operators (+, −, *, etc.), place an apostrophe (') before the entry or you may get unexpected results.

Why Use Range Names?

When you type a command as a label, cell references within the command are meaningless to *Symphony* until it processes the macro. For example, if your macro uses the command {MENU}Cb3~h20~ to copy information from a table and you move the table to another part of the worksheet, your macro no longer copies the proper information. If, however, the cells are named *source* and *destination* and the macro command is {MENU}Csource~destination~, moving the table containing these cells does not adversely affect the macro. If while writing a macro you need to rearrange your worksheet, you'll be much happier if you've used range names instead of cell references in your macro code.—*D.G.*

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SCHEDULING YOUR CASH REQUIREMENTS

This spreadsheet model helps you keep cash flow in hand and reminds you to pay creditors who don't send monthly invoices.

BY CHARLES W. KYD

As my work changes, so do my templates, most of which have a useful life of three or four months, seldom more. But one template has been in constant use, virtually unchanged, for more than four years. First created in *Magicalc* on an Apple II, it now runs in *1-2-3* on an IBM PC.

The template solves two related problems I once had when paying company bills. The first was that I kept forgetting to pay monthly bills to people who didn't send monthly invoices. When your landlord or your banker calls to ask why you have not sent a check, the response "Well, um, I forgot" tends to complicate the business relationship.

The second problem was that the company didn't have the cash. Occasionally, this was a fundamental problem, but usually it was merely one of timing. If the company was short of cash, it was because no one had realized that so many bills, in addition to accounts payable and payroll, were due in the same week.

Before computerized spreadsheets, I tried to maintain a written schedule of these cash requirements. However, this never worked because no one ever took the time to write out a new schedule when the old one expired.

The Scheduled Payments Calendar figure shows my solution. This calendar lets my spreadsheet do all the work in scheduling payments. It tells me what to pay, and I simply release the cash.

To use the calendar, I retrieve the calendar template and enter the new beginning date. Because I have set the recalculation method to manual, when I press the CALC key, *1-2-3* places the new dates at the head of the columns and inserts the proper amounts to be paid each week. Then I print the template.

I keep a copy of this printout to use in the weekly cash requirements forecast that I prepare. This handwritten forecast summarizes data from the calendar, payroll, our aged (time-sensitive) payables, and my list of special cash requirements. I always make sure that the accounts payable aging doesn't accidentally include payments scheduled by the calendar.

The accounts payable supervisor receives two copies of the Scheduled Payments Calendar and uses one copy as a checklist for making the scheduled payments. Within two weeks, this copy is so marked up with red ink, yellow highlighter, and black pen that it's of no use to anyone but the supervisor. That's why there is a second copy upon which we record changes that must be made to update the calendar.

There are always changes. Sometimes we must revise our estimates for the telephone and utilities bills. Sometimes we add vendors. And sometimes, glory be, we pay off a loan and eliminate a payment.

Several columns in the figure bear explanation. In the Scheduled Monthly section, the Date to Pay column records the day of the month that I should send a check. The Pay Every column gives the frequency of payment. A number one appears in the column for bills that are paid monthly. A two indicates a bill paid every other month. A bill paid twice yearly has a six.

The Pay Every column in the Scheduled Weekly section at the bottom of the figure uses the same approach.

Charles W. Kyd is the vice president of finance for a manufacturer in Thousand Oaks, California. He has an M.B.A. from the University of Washington.

	A	B	C	D	E	F	G	H	I	J
1	CAL									
2										
3								16-Aug	23-Aug	30-Aug
4										
5		Beginning Date								
6		------------------------	------------------------	--------	--------		Pay From:	16	23	30
7		Calendar begins with this	>	Day:	16		Pay To:	23	30	32
8		date. Change it, then	>	Month:	8					
9		recalculate.	>	Year:	85		Pay From:	16	23	1
10							Pay To:	23	30	6
11										
12										
13							Scheduled Payments Calendar			
14						=======	============	===========	===========	===========
15		Scheduled Monthly								
16		====================								
17	Beginning			Date	Pay	GL				
18	Date	Payee	Reason	to Pay	Every	Acct	Amount	16-Aug-85	23-Aug-85	30-Aug-85
19	----------	--------------------	------------------	------	-------	------	------------	-----------	-----------	-----------
20	30-Jul-84	1st National Bank	Loan	30	1	Misc	$1,219.50	$0.00	$0.00	$1,219.50
21	13-Jan-81	Walter R. Smith	Loan	15	1		$2,000.00	$0.00	$0.00	$0.00
22	03-Nov-78	Universal Rheostat	Loan	1	1		$8,550.00	$0.00	$0.00	$8,550.00
23	23-Apr-82	Wells Insurance	General Liability	23	3	6553	$220.00	$0.00	$0.00	$0.00
24	10-Oct-84	GTE	805-555-4431	17	1	7553	$2,300.00	$2,300.00	$0.00	$0.00
25	01-Jul-83	Tri-State Leasing	Bob's Chrysler	2	1	7621	$325.00	$0.00	$0.00	$325.00
26	30-Mar-81	Bibb Electronics	AP Paydown	10	6	2302	$4,817.50	$0.00	$0.00	$0.00
27							------------	-----------	-----------	-----------
28							$19,432.00	$2,300.00	$0.00	$10,094.50
29		Scheduled Weekly								
30		====================								
31	Beginning			Day	Pay	GL				
32	Date	Payee	Reason	to Pay	Every	Acct	Amount	16-Aug-85	23-Aug-85	30-Aug-85
33	----------	--------------------	------------------	------	-------	------	------------	-----------	-----------	-----------
34	16-Jul-84	Chem. Corp.	AP Breakdown	Mon	3	2303	$1,219.00	$0.00	$1,219.00	$0.00
35	20-Jul-84	Smith Packaging	AP Paydown	Mon	1	2303	$150.00	$150.00	$150.00	$150.00
36	25-Jan-82	B. Attkinson	Royalty Payment	Fri	6	2497	$955.00	$0.00	$955.00	$0.00
37							------------	-----------	-----------	-----------
38							$2,324.00	$150.00	$2,324.00	$150.00
39										
40										
41			Total Cash Requirements Per Week:					$2,450.00	$2,324.00	$10,244.50

Template for automatically scheduling your cash requirements. To use the template, enter the beginning date of the calendar, the various pay periods, the list of people and organizations to be paid, the frequency of payment, and the date of the month to pay each bill. The worksheet calculates how much money you must pay out each week, thus eliminating the element of surprise that can undermine cash flow.

This column, however, refers to weeks, not months. Your company may not require a Scheduled Weekly section. It is part of my template because I once worked for a company with seasonal sales. During the hard times, we would convince vendors to accept small amounts every week or two until we had paid their bills. This section kept track of those commitments.

BUILDING THE CALENDAR TEMPLATE

Before building a calendar of your own, enter the data shown in the Scheduled Payments Calendar figure to make sure you've entered the formulas correctly.

Set worksheet recalculation to manual by issuing the /Worksheet Global Recalculation Manual command (in *Symphony*, MENU Settings Recalculation Method Manual). Doing this causes the worksheet to recalculate only when you press the CALC key. Unless you have plenty of time to kill, this should be your first step in nearly every spreadsheet you create.

As in all my spreadsheets, cell A1 contains the name of the spreadsheet. I called this one CAL, but you may enter any name you wish.

Set the column widths as follows:

COLUMN	WIDTH
A	10
B	20
C	18
D	6
E	7
F	6
G	12
H through J	11

Next, fill in the beginning day, month, and year as shown in E7 through E9. These are the dates you change to update the calendar. Enter the headings and explanation for these dates as shown.

Next, move to cell H3. Use the /Range Format Date 2 command (in *Symphony*, MENU Format Date 2) to format cells H3 and I3. The formula in cell H3 is @DATE ($E$9,$E$8,$E$7). The formula in cell I3 is 7+H3. Copy cell I3 to cells J3 and K3.

Note that the calendar ends in column J, but remember that you copied the formulas to column K. This is

because each formula needs to look one column ahead. When you read the formulas and explanations in the table, you'll see why this is necessary. (To conserve space, column K is omitted in the figure.)

Enter the labels shown in cells G6 through G10. Then enter the formulas for cells H6 through H10 as follows. Copy these formulas from column I through column K.

FORMULA	EXPLANATION
`H6: @DAY(H3)`	This is Monday's date.
`H7: @IF(H6>I6,32,I6)`	If next Monday is in a new month, evaluate to 32 here; otherwise, evaluate to this Monday's date.
`H9: @IF(H6>I6,1,H6)`	If next Monday is in a new month, evaluate to 1 here; otherwise, evaluate to this Monday's date.
`H10: @DAY(I3)`	Next Monday's date.

You are now ready to create the Scheduled Monthly section.

Enter the headings as shown. The dates above the columns (cells H18 to K18) use the same formulas as cells H3 to K3. They are formatted, however, using the /Range Format Date 1 command (in *Symphony*, MENU Format Date 1). Format the date cells in column A (cells A20 through A26 and A34 through A36) using /Range Format Date 1 (in *Symphony*, MENU Format Date 1). Then enter the dates using the @DATE function.

Enter only the first three rows of data under the headings Beginning Date through Amount. The Scheduled Monthly Formula table shows the formula contained in H20. This long formula is broken into small pieces and is explained in the table. You can enter the formula from the pieces, but make sure you don't insert any blank spaces.

Copy the formula in cell H20 to cells I20 through J20. Then copy this row to cells H21 through J22 and press the CALC key to recalculate the spreadsheet. If your model now contains the same numbers as in the figure, you have entered the formula properly. Once the formula works, enter the rest of your data, then copy the formula down the spreadsheet as necessary.

SCHEDULED MONTHLY FORMULA IN CELL H20

```
@IF((($D20>=H$6#AND#$D20<H$7)#OR#($D20>=H$9#AND#$D20<H$10))#AND#@MOD
(@MONTH(H$18)-@MONTH($A20)+12*(@YEAR(H$18)-@YEAR($A20)),$E20)=0,$G20,0)
```

FORMULA	EXPLANATION
`@IF(`	If
`(($D20>=H$6#AND#$D20<H$7)`	date is between the first set of dates
`#OR#`	or
`($D20>=H$9#AND#$D20<H$10))`	date is between the second set of dates,
`#AND#`	and
`@MOD(`	
`@MONTH(H$18)`	the number of months
`-@MONTH($A20)`	since the Beginning Date
`+12*(`	
`@YEAR(H$18)`	
`-@YEAR($A20)),`	
`$E20)`	divided by the Pay Every figure
`=0,`	leaves a remainder of zero,
`$G20,`	then put the Amount here;
`0)`	otherwise, put zero.

SCHEDULED WEEKLY FORMULA IN CELL H34

```
@IF(@MOD(@INT((H$32-$A34)/7),$E34)=0,$G34,0)
```

FORMULA	EXPLANATION
`@IF(`	If
`@MOD(`	
`@INT((H$32-$A34)/7),`	the number of completed weeks since the Beginning Date
`$E34)`	divided by the Pay Every figure,
`=0,`	leaves a remainder of zero,
`$G34,`	then put the Amount here;
`0)`	otherwise, put zero.

An explanation of the Scheduled Monthly formula, found in cell H20 of the figure, and the Scheduled Weekly formula, found in cell H34 of the figure. Although the formulas seem complicated, they offer a straightforward procedure for placing the needed payment into the correct weekly slot. Both formulas contain the @MOD function. @MOD calculates the remainder when the first number in parentheses (the number of months or weeks since the Beginning Date) is divided by the second number (the Pay Every figure). The @INT function in cell H34 rounds positive numbers down to the nearest whole number and negative numbers up to the nearest whole number.

Next, use the @SUM formula to total the columns. Be sure that your @SUM range does not include the dates in row 18. Including the dates, which have numeric value, will distort your @SUM. No use making your weekly cash requirements look worse than they actually are. You are now ready to create the Scheduled Weekly section.

Copy the column headings in rows 17 and 18 of the monthly schedule to rows 31 and 32 of the weekly schedule. Then change the Date to Pay column heading in the weekly schedule to read Day to Pay.

Enter the three rows of data into columns A through G (Beginning Date through Amount). Then enter the formula for H34 as shown in the table. Copy the formula to all cells in the range H34..J36 and calculate the @SUMs. Again, make sure your @SUM range does not include the dates in row 32.

Finally, enter the label Total Cash Requirements Per Week. This row is simply the sum of the monthly section and the weekly section. Enter the formula +H28 +H38 in cell H41 and copy across the row to cell J41.

One advantage of this model is that you can add extra columns to extend the calendar as far as you wish. Be sure to add an extra column (column K, in this example) so that the formulas work correctly. When you print your Scheduled Payments Calendar, define your print range so that the model looks something like the figure. If available, use the compressed print feature on your printer.

Before you print anything, make sure that you recalculate your spreadsheet. If you're like me, though, you'll probably forget to do this. That's why I use a simple little calc-and-print macro like the one that follows. First, issue the /Range Name Create command, enter *printhis* as the name for the range, and highlight the area to be printed. Then enter this *1-2-3* macro into the blank area of the worksheet.

	A	B	C	D	E	F
50	\a	{CALC}				
51		/PPRprinthis~AGPPQ				

Issue the /Range Name Labels Right command to name the macro '\A.

In *Symphony*, issue the MENU Range Name Create command, enter *printhis* as the name for the range, and highlight the area to be printed. Then enter the following macro into a blank area of the worksheet.

	A	B	C	D	E	F
50	\a	{CALC}				
51		{SERVICES}PSSRprinthis~QAGPPQ				

Issue the MENU Range Name Labels Right command to name the macro '\A. This macro will recalculate your spreadsheet, print the range named *printhis*, and issue two Page-Advance commands to your printer.

Once you have this model working, the next steps are easy. Just substitute your own data, print your own schedule, and pay your own bills. ■


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USING LIFE-CYCLE ANALYSIS

These spreadsheet modeling techniques, coupled with the financial functions built into *1-2-3* and *Symphony*, can help you evaluate your next capital equipment purchase.

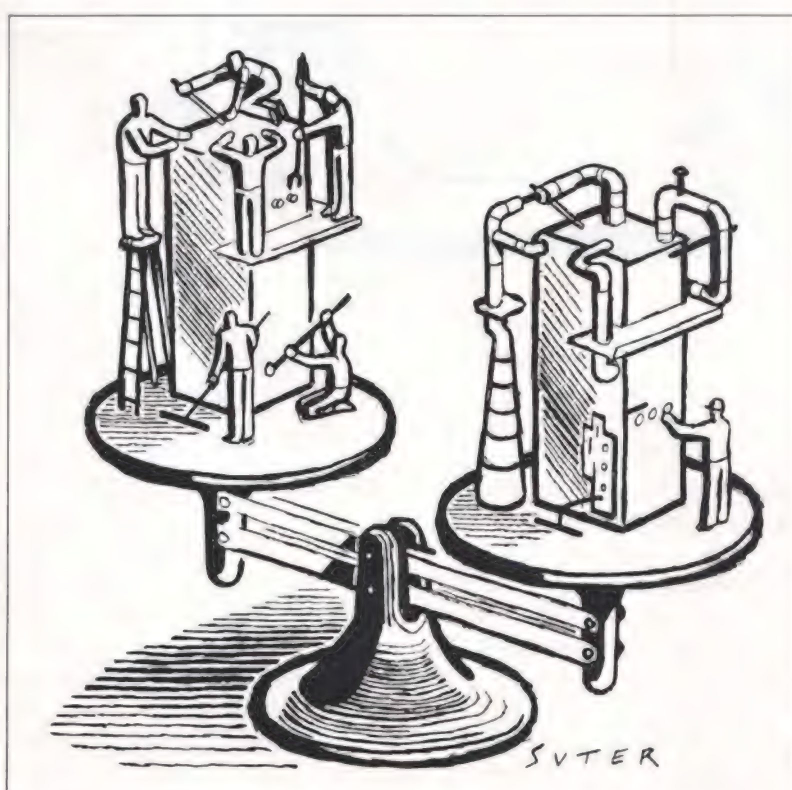
BY JAMES H. GREEN

How much is your company willing to pay for quality when investing in new capital equipment? Common wisdom holds that while quality costs more initially, it actually costs less in the long run. Unfortunately, the life span of a piece of equipment may be too short for you to recoup large, up-front equipment expenses. By using life-cycle analysis (see "About Life-Cycle Analysis" sidebar) you can determine how much you should spend initially for equipment that may, over time, reduce operating expenses.

For example, assume that a manufacturer is planning to invest in a new piece of automated equipment. A feasibility study has justified automation, and now management must analyze the life-cycle costs of two machines that meet manufacturing needs. Using information from the vendors, the purchasing department prepares the comparison shown in table 1. This table summarizes the estimated costs of each product. The initial cost includes the purchase price, shipping, installation, and training. The table also indicates that recurring labor and maintenance costs for Product B are half those for Product A. However, it is impossible to determine intuitively whether Product B is worth the larger initial investment.

Additional costs associated with the two equipment choices appear in table 2. These include costs common to each product, as well as factors such as the cost of money, electricity, and floor space. Since life-cycle analysis measures the trade-offs between capital investment and future costs, the table includes a provision for inflation. The more inflation increases necessary expenses, the more attractive an investment in cost-reducing equipment becomes. An inflation estimate for each cost appears in the table. If you are uncertain about these estimates, a sensitivity analysis can help you determine the impact each item has on overall costs.

Tax considerations based on 1984 tax assumptions are also reflected in table 2. There is an 8 percent investment tax credit in effect, as well as the tax-reducing



DAVID SUTER

James H. Green lives in Portland, Oregon, is a published author, and has an M.B.A. from City University in Seattle. Among his books is Automating Your Office, *McGraw-Hill, 1984.*

IT IS IMPOSSIBLE TO DETERMINE INTUITIVELY WHETHER A PRODUCT IS WORTH ITS HIGH INITIAL COST.

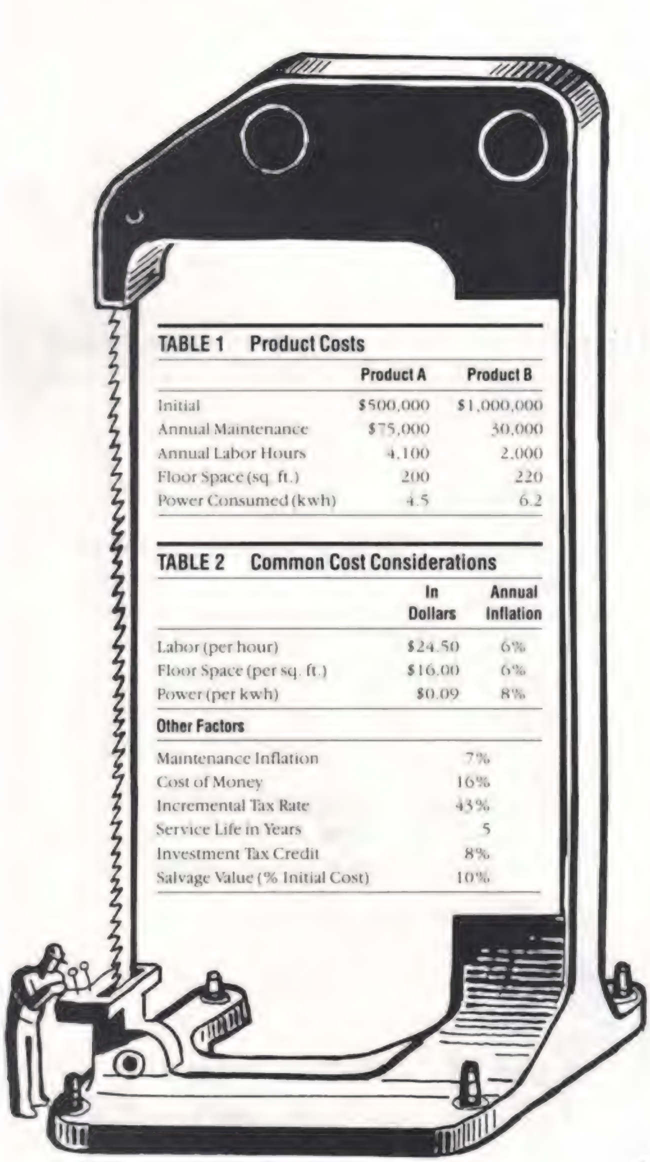


TABLE 1 Product Costs

	Product A	Product B
Initial	$500,000	$1,000,000
Annual Maintenance	$75,000	30,000
Annual Labor Hours	4,100	2,000
Floor Space (sq. ft.)	200	220
Power Consumed (kwh)	4.5	6.2

TABLE 2 Common Cost Considerations

	In Dollars	Annual Inflation
Labor (per hour)	$24.50	6%
Floor Space (per sq. ft.)	$16.00	6%
Power (per kwh)	$0.09	8%
Other Factors		
Maintenance Inflation	7%	
Cost of Money	16%	
Incremental Tax Rate	43%	
Service Life in Years	5	
Investment Tax Credit	8%	
Salvage Value (% Initial Cost)	10%	

effects of operating expenses and depreciation. To calculate the total tax effects, you must know the company's incremental tax rate, which is the sum of federal, state, and local taxes. Service life is used in calculating the tax effects of depreciation. For example, you might assume the product will last seven years, but that it will be depreciated on a straight-line basis over five years.

BUILDING AN ANALYSIS SPREADSHEET

With cost, tax, and inflation information, you can construct a worksheet model as shown in the "Life-Cycle Analysis" figure. You could compare many products at a time, but it is wise to keep the spreadsheet manageable by limiting comparisons to two products at a time. The cost and product data shown in tables 1 and 2 are included in cells below the main body of the model. This protects model formulas from being altered when you enter new cost or product data.

Model assumptions and corresponding formulas are the same for both products. Column D, rows 6 through 9, shows the first-year after-tax costs of recurring expenses for Product A. The equivalent calculations for Product B appear in column D, rows 15 through 18. The after-tax maintenance cost for Product A shown in cell D6 is calculated by the following formula: −B29*(1−H31). This formula multiplies the product's maintenance cost in row 29 by the company's after-tax expense factor represented by the value (1−H31). An equivalent formula for Product B resides in cell D15. (Costs are negative values because they represent outgoing cash flows.)

A more involved calculation takes place in cell D7. Here the after-tax operator labor cost is calculated. In this case, the labor cost per hour in cell H26 is multiplied by the number of hours of labor, and then by the after-tax expense factor. The resulting formula is −B30*H26*(1−H31). Costs for succeeding years appear in columns E through J. These calculations use the preceding year's cost multiplied by the inflation factor for that item. Be sure to use absolute references to represent inflation factors in cells I26 through I29 so the references to those cells will stay the same when you copy formulas across to columns E through J. For example, to calculate the inflated maintenance cost for 1986 in E6, use the formula +D6*(1+$I$29). Other key formulas appear in table 3.

All annual costs in rows 6 through 9 and 15 through 18 are expressed as negative values since they represent outgoing cash flows. Rows 10 and 11, Depreciation Tax Effect and Salvage, will not require outgoing cash and thus do not carry a negative sign. Depreciation has an effect similar to revenue because it represents a tax savings. In this case, the straight-line depreciation is based on a five-year service life: The equipment depreciates by 20 percent each year. The tax effect is 43 percent of that amount. The formula used to calculate the result in cell D10 is ($B$26/$H$32)*$H$31.

For Product A, column items are totaled in row 12 with the @SUM function. The net present value of all these sums is calculated in column C12. Here each year's cash flow is discounted to its present value using the cost of money in cell H30. The product's net cost, found in cell B28, is then subtracted from this amount. The formula used in calculating the net present value for Product A in cell C12 is @NPV(H30,D12..J12)−B28.

A comparison of life-cycle analysis results in rows 12 and 21 seems to indicate that Product B is a wiser choice than Product A. Product B has a positive cash flow in every year except 1990. Keep in mind, however, that Product B has a much higher initial cost. As a result, the key factor in the comparison is the difference between the net present values of the two products. This figure appears in cell C23 and represents

DAVID SUTER

	A	B	C	D	E	F	G	H	I	J
1						Life-Cycle Analysis				
2			Net Present							
3			Value	1985	1986	1987	1988	1989	1990	1991
4										
5	Product A									
6	Maintenance			-42750	-45743	-48944	-52371	-56037	-59959	-64156
7	Operator Labor			-57257	-60692	-64333	-68193	-72285	-76622	-81219
8	Floor Space			-1824	-1933	-2049	-2172	-2303	-2441	-2587
9	Power			-2022	-2184	-2359	-2547	-2751	-2971	-3209
10	Depreciation Tax Effect			43000	43000	43000	43000	43000		
11	Salvage									50000
12	Total		-793061	-60853	-67552	-74686	-82284	-90376	-141993	-101172
13										
14	Product B									
15	Maintenance			-17100	-18297	-19578	-20948	-22415	-23984	-25662
16	Operator Labor			-27930	-29606	-31382	-33265	-35261	-37377	-39619
17	Floor Space			-2006	-2127	-2254	-2390	-2533	-2685	-2846
18	Power			-2786	-3009	-3250	-3510	-3791	-4094	-4421
19	Depreciation Tax Effect			86000	86000	86000	86000	86000		
20	Salvage									100000
21	Total		-838877	36177	32961	29536	25887	22001	-68139	27451
22										
23	Net Present Value A vs. B		-45816							
24										
25	Product Costs	A	B			Common Costs			Inflation	
26	Initial Cost	500000	1000000			Labor (per hour)		$24.50	6.0%	
27	Investment Tax Credit	40000	80000			Floor Space (per sq. ft.)		$16.00	6.0%	
28	Net Cost	460000	920000			Power (per kwh)		$0.09	8.0%	
29	Maintenance Cost	75000	30000			Maintenance Inflation			7.0%	
30	Labor in Hours	4100	2000			Cost of Money		16.0%		
31	Floor Space in sq. ft.	200	220			Incremental Tax Rate		43.0%		
32	Power Consumed (kwh)	4.5	6.2			Service Life in Years		5		
33						Investment Tax Credit		8%		
34						Salvage Value		10%		

This life-cycle analysis spreadsheet compares seven years of data on two pieces of manufacturing equipment being considered for purchase. The lower-left corner of the worksheet contains individual product costs, and the lower-right portion contains costs common to both products. Calculations used for each product are identical, except for relevant cell references. Cell C23 contains the most important indicator in this life-cycle analysis spreadsheet. The net present value of A versus B indicates which product represents the best investment. In this case, a negative cash flow indicates that Product B will entail higher costs over its useful life than will Product A.

TABLE 3 Key Cell Formulas for Product A

Maintenance	D6: −B29*(1−H31) E6: +D6*(1+$I$29) J6: +I6*(1+$I$29)
Operator Labor	D7: −B30*H26*(1−H31) E7: +D7*(1+$I$26) J7: +I7*(1+$I$26)
Floor Space	D8: −B31*H27*(1−H31) E8: +D8*(1+$I$27) J8: +I8*(1+$I$27)
Power	D9: −24*365*H28*B32*(1−H31) E9: +D9*(1+$I$28) J9: +I9*(1+$I$28)
Depreciation Tax Effect	D10: (+$B$26/$H$32)*$H$31 H10: (+$B$26/$H$32)*$H$31
Salvage	J11: +H34*B26
Net Present Value	C12: @NPV(H30,D12..J12)−B28
Sum for Year	D12: @SUM(D6..D11) J12: @SUM(J6..J11)
Net Present Value A vs. B	C23: +C21−C12
Investment Tax Credit	B27: +B26*H33
Net Cost	B28: +B26−B27

TO GAIN THE MOST UTILITY FROM A LIFE-CYCLE ANALYSIS, CONSTRUCT A GENERAL-PURPOSE TEMPLATE.

the difference in the two products' net present values, or discounted cash flows, over the life of the investment (C21 − C12). If this number is positive, an investment in Product B generates cash and costs less than an investment in Product A. If the number is negative, the investment in Product B is more expensive and consumes cash. In the example, cell C23 yields −45816, indicating that Product A is the more attractive equipment choice.

THE ADVANTAGES OF ANALYSIS

There are two major advantages to using a spreadsheet for life-cycle analysis. First, once you have constructed a template, you can compare many products easily. Second, you can perform sensitivity analysis on any factor influencing the purchase decision. For example, usually you can compute the costs of power and floor space accurately. However, labor and maintenance costs are more difficult to estimate. Suppose you believe that the maintenance cost estimate is accurate to within plus or minus 20 percent. Multiplying cell B29 by 1.2 and 0.8 will yield a range of net present values. In calculating the sensitivity of these figures, you will find that if the maintenance costs of Product A increase by slightly more than 22 percent, Product B is a better investment. Cutting Product B's maintenance costs by 56 percent will also make it the better investment. Judgment enters the analysis at this point. To justify purchasing Product B, you must estimate the probability of a large change in either of these factors.

You can calculate the internal rate of return (IRR) of Product B by reducing the cost of the money (cell H30) until there is no difference between the net present values of the two products. A little experimentation shows this to be 12.6 percent. If the IRR is lower than your cost of money, then the equipment will not pay for itself. Lotus *1-2-3*, *Jazz*, and *Symphony* include an IRR function that will produce the same result. When using this function, pay close attention to the algebraic sign of each year's cash flow. It is easier to obtain IRR by changing the cost of money in C30.

By using sensitivity analysis (see "Sensitivity Analysis—A Structured Approach to What-If," July issue), our life-cycle model can also help us determine that Product B's purchase price would need to be $924,000 for it to break even with Product A. What about inflation? Product B becomes attractive only if labor costs inflate at more than 17 percent or if maintenance costs go up more quickly than 19 percent per year. Because neither of these events seems probable, you can conclude that this equipment acquisition is insensitive to inflation. To gain maximum utility, construct a general-purpose life-cycle template with more rows and columns than are shown in the example. Such a template can be expanded for models that involve more cost factors. To encompass longer time periods, expand models horizontally. For shorter periods, be sure to change the range of the net present value formula in cells C12 and C21.

Although this life-cycle analysis has compared two manufacturing machines, the process used is valid for analyzing any capital investment. Whenever you must determine which alternative is the better buy and the decision cannot rest on intuition, spreadsheet-based life-cycle analysis can yield a valid result with a reasonable investment of time and energy. ■

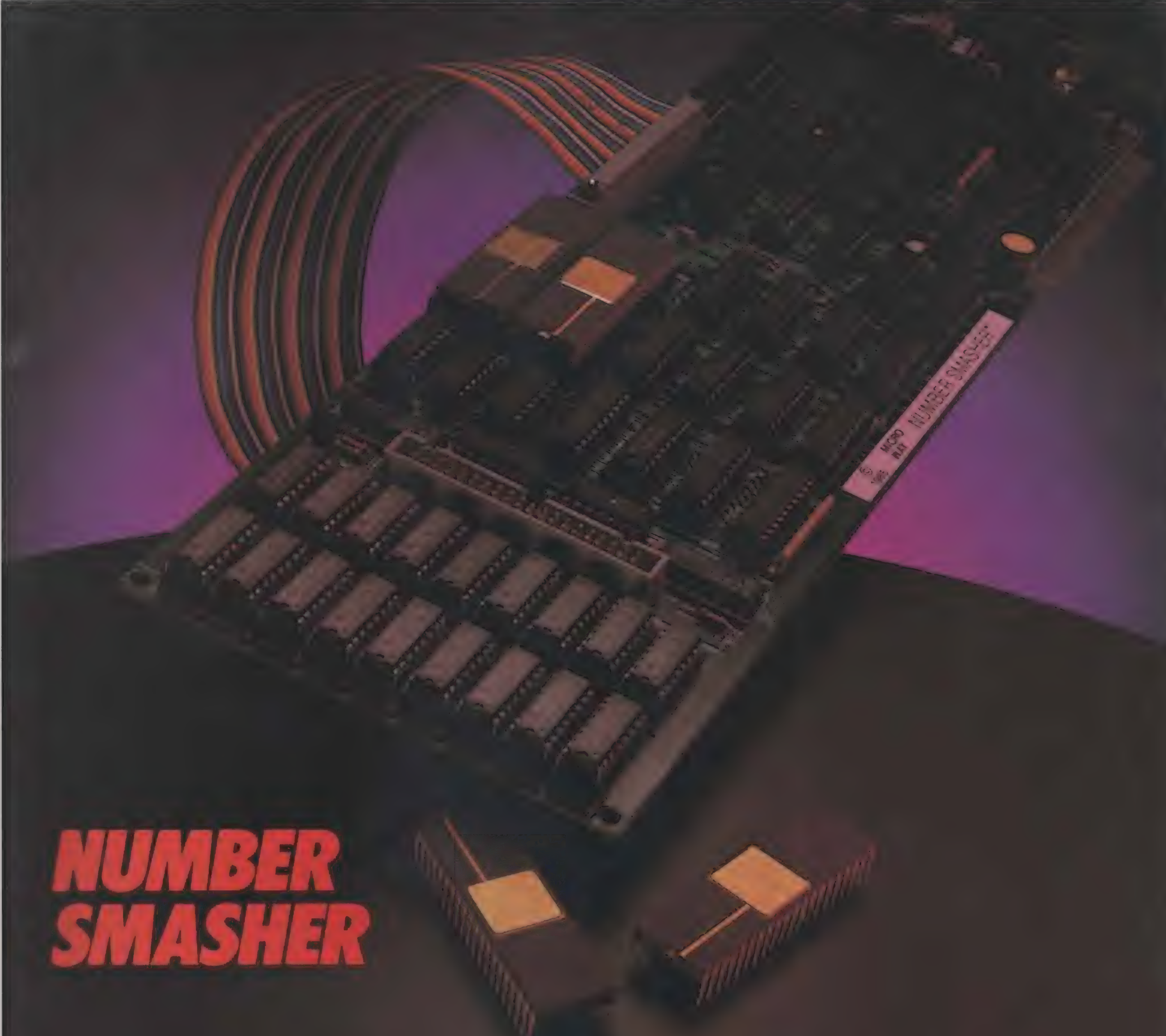
ABOUT LIFE-CYCLE ANALYSIS

Life-cycle analysis (LCA) determines which of several alternatives requires the least amount of cash throughout a product's life. The negative cash flows to consider in an LCA include initial costs, such as purchase price, shipping, and installation. Also included are recurring expenses, such as maintenance, operator labor, power and fuel, and floor space. Positive cash flows include investment tax credits, tax savings from depreciation, and any revenues generated by the product. Finally, at the end of the product's life, salvage value is credited to the analysis to reflect any residual value that exists.

To compare cash flows, you must eliminate the variation in time in which they occur. This is done by discounting, a process that expresses all cash flows on the basis of their present worth. Present worth is the discounted value of a future cash flow at the company's cost of money.

Some companies base purchase decisions on the payback period, or the number of years it takes to repay the cost of an investment. The problem with using payback for analysis is that it fails to recognize the time value of money. You can obtain a better comparison using life-cycle analysis, which compares purchase alternatives in three steps. First, identify cash flows associated with ownership of a product from cradle to grave. Second, discount the cash flows at the organization's cost of money from the year they begin to the present. Third, calculate the net present value by adding discounted cash flows and subtracting the initial investment.

Assuming that cash flows have been estimated accurately, the product with the highest net present value is the best investment.



NUMBER SMASHER

Speeds Up Everything...Especially 1-2-3™!

The MicroWay NUMBER SMASHER triples the speed of all cpu bound software while doubling the speed of 8087 bound software. When combined with MicroWay's FASTBREAK™ it results in an increase in the speed of 1-2-3™ of up to 80 to 1! If you're tired of WAITing, the SMASHER is the card for you!

The heart of the NUMBER SMASHER is a 9.54 mhz 8086 working with a matched high speed 8087. The card comes standard with 512K of 16 bit RAM and can be expanded to 640K. It triples the throughput of your original 8088 by doubling the system clock speed and quadrupling the data bus bandwidth.

Software compatibility is guaranteed by the nature of our card. It does not augment the 8088, but replaces it with a special 8086 that runs as a true 16-bit processor in the first 640K of ram and as an 8-bit processor everywhere else.

Examples of software which show dramatic speed-ups include AUTOCAD, 1-2-3™ worksheets which depend heavily on financial or transcendental functions, and multi-user operating systems. Any program written with an MS-DOS compiler that supports the 8087, such as MS-FORTRAN or 87BASIC, will run on the NUMBER SMASHER at least a factor of 2.5 times faster! Software that comes with the card also increases the throughput of I/O bound programs and includes a disk cache routine, ram disk and print spooler.

The NUMBER SMASHER is an upgrade product for 8088 based PCs and compatibles. It works on the IBM-PC and XT, the COMPAQ and compatibles manufactured to the IBM-PC hardware standard. Contact MicroWay or your local MicroWay Installation Center for technical specifications and supporting benchmarks.

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Computers are supposed to be tools that expand our powers of reason, instruments that do for our thinking what levers and pulleys do for our muscles. But to many users, the machines are more like extensions of the world of sorcery, of both white and black magic.

On the one hand, there are mystic spells. Cabalistic commands such as @FV allow great feats to be accomplished with an airy gesture: Future values can be calculated with a tap of the Return key.

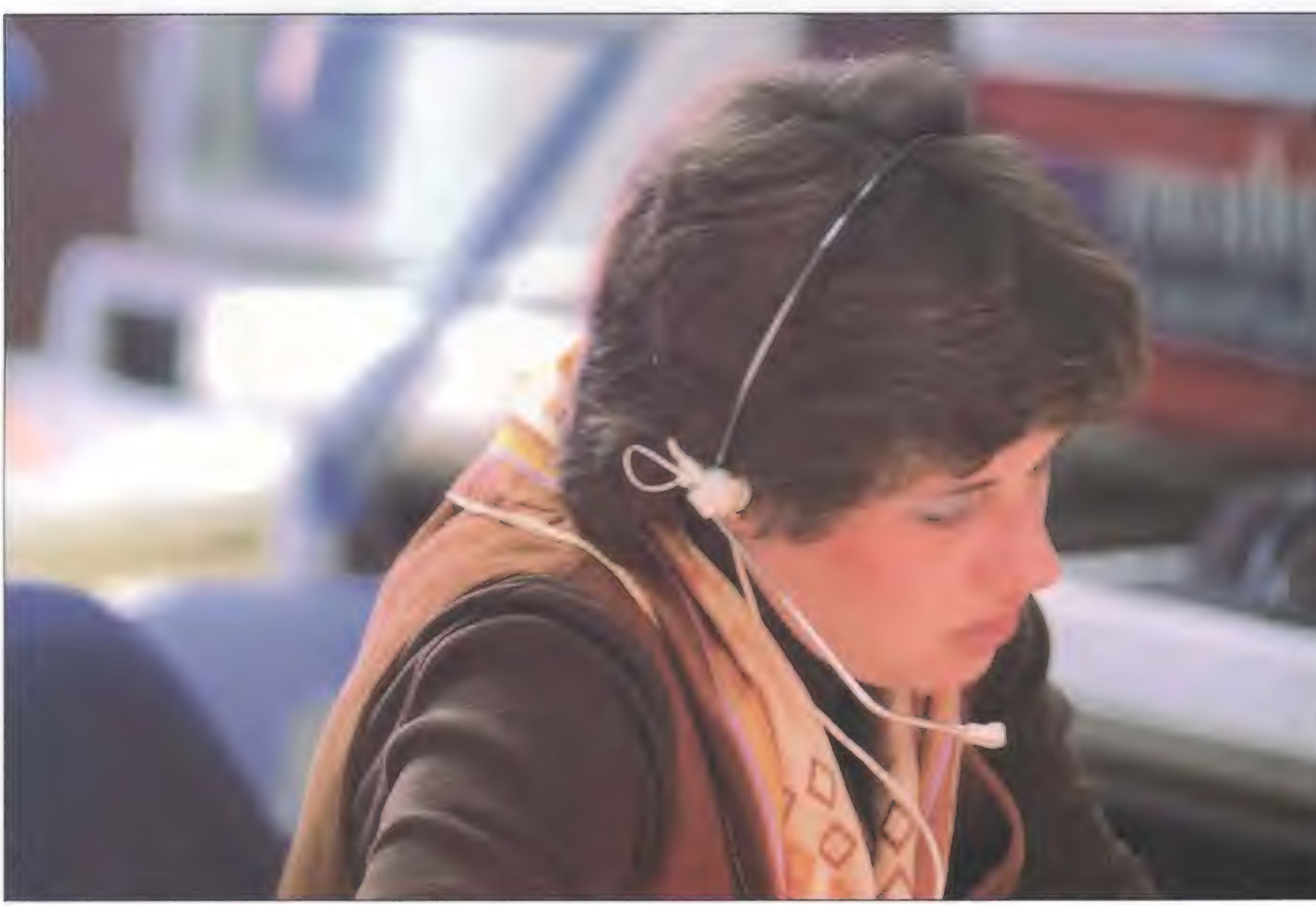
Fred Hapgood is a free-lance writer. When not traveling on assignment, he resides in Boston.

On the other hand, antagonistic spirits appear from nowhere to provoke failure and disruption while mocking the user with such gibberish as *Divide overflow* or *EOF mark not found*. In general, the behavior of these spirits is unpredictable. They seem especially fond of printers, and careful research has uncovered that their activity peaks at about 4 P.M. on the last day of the fiscal year. At that time, worksheets, no matter how carefully constructed, become favored targets.

Computer demons grow merciless when they sense a confused user, but the proper command confidently entered will almost always exorcise them. The problem is to discover that command. Sometimes it can be found

THE WIZARDS OF LOTUS PRODUCT SUPPORT

BY FRED HAPGOOD



in the book of magic spells supplied with the software program. Sometimes the person in the next office or the dealer can supply it. But sometimes, when the demon is especially stubborn or when time pressures are extreme, it is necessary to go all the way to the top—to pick up the phone and call the wizards directly.

"Hello, *1-2-3* Support."

"Ah have a 10-line gap in the sennah of mah page."

This is a real exchange. The caller, who judging by his accent has roots somewhere in Texas, discussed his problem in a tone that sounded frustrated, weary, yet interested. These gaps, packets of white space, kept appearing in his printout. They were always 10 lines deep and occurred at regular intervals. Nothing he did managed to perturb, let alone eliminate, them. There was some sort of message here, but what?

"Have you used the Align command?" Support asked.

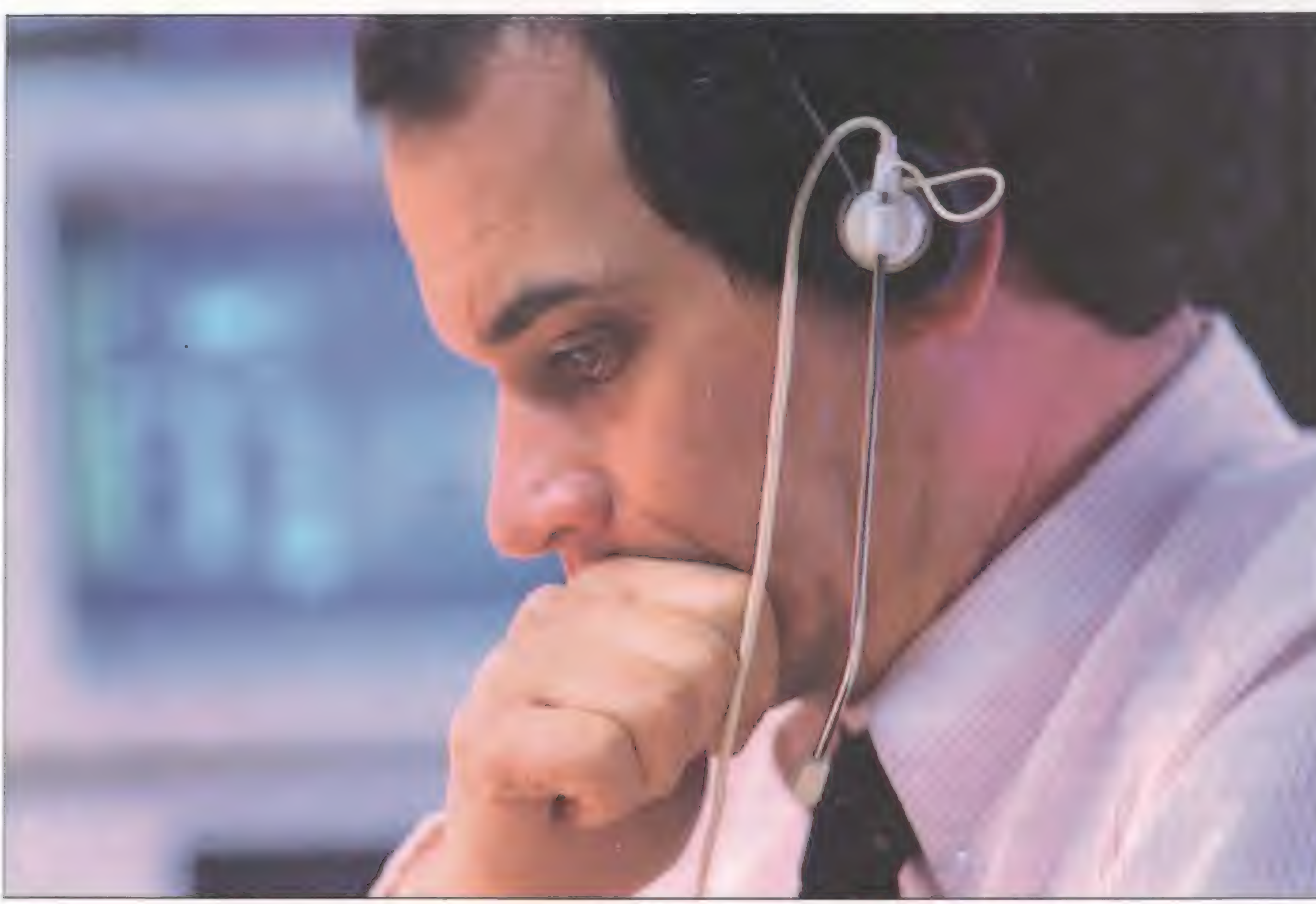
"The Align command!" You could almost hear the Texas caller smack his forehead. "Well, nooo," he drawled.

"The Align command," Support continued, "initiates the line count at the top of the page so that the page breaks fall in the right place when you . . ."

"Wow! It works! Fantastic!" the caller whooped, interrupting Support in mid-explanation and ringing off. Another demon sent packing.

Conjuring up solutions to thorny software problems is just one of the many things these good wizards do each day.

PHOTOGRAPHY
BY BILL GALLERY



Product support is one of those peculiar institutions that sets microcomputer software publishing a world apart. Probably nowhere else in business do owners of a product costing only a few hundred dollars expect to call the manufacturer and get free expert help. Such services are expensive to provide and complicated to administer. Sometimes customers and dealers prefer to rely on the support excessively, rather than spend even modest amounts of time wrestling with the documentation. In fact, not all software publishers regard the customer's right to such a service as inalienable.

Lotus Product Support is available to all users who have returned their warranty registration cards. Product Support specialists prefer that callers be seated in front of a PC when they call. This allows the user to duplicate any recommended keystroke command sequences. Callers should also be prepared to describe exactly what hardware they are using. Knowing which PCs, monitors, printers, and expansion boards the caller is using expedites the specialist's diagnosis. All questions pertaining to Lotus software are fair game; however, specialists will direct callers with questions about the Disk Operating System (DOS) or nonsupported peripheral hardware to contact the appropriate manufacturers. Questions regarding the customization of specific applications are also deemed inappropriate.

As Lotus executives point out, the logic of the market compels a heavy investment in product support. Stephen Crummey, Lotus's vice president of sales and service, stated in an interview, "Support is important to a company with the type of market position we have. And it is especially important when you start looking at communicating with mainframes. Those people are accustomed to quality support. So for us, quality support is the name of the game."

COMMON QUESTIONS AND ANSWERS ABOUT USING 1-2-3

Q. When I type *lotus* or *123* at the DOS prompt, the screen goes blank except for the blinking cursor in the top-left corner of the screen. Then the keyboard freezes, and I have to reboot my system. Sometimes I get the *Error loading drivers* message. What's going on?

A. These effects are caused by incorrect or missing driver files. To fix these problems, install or reinstall the drivers as instructed in the "Getting Started" section of your manual. Make sure you choose the correct drivers for your hardware combination and be sure to specify the correct target drive.

Q. When I try to insert a row or column into my worksheet, I get the message *Worksheet full*. I know there are plenty of empty cells in the worksheet, so what's the problem?

A. You have accidentally created a large active area on the worksheet. This happens when you format an extensive portion of the worksheet or when you put information into a cell located in either the far-right side or the bottom of the worksheet. Determine the active area of a worksheet by pressing End Home. All the cells above and to the left of the End Home position are active even when they are blank.

Merely deleting or erasing cells containing data will not free memory. To reduce the size of a worksheet, use the /File Xtract Formulas command to make a new file containing only the pertinent portion of the worksheet. This procedure creates a streamlined worksheet. When you retrieve this worksheet, you can add columns or rows to it as needed.

Q. I am using a large worksheet, and I find that it takes a great deal of time to recalculate after each entry. What can I do to speed things along?

A. Change the recalculation setting to manual by issuing the /Worksheet Global Recalculation Manual command. When the worksheet is set to manual recalculation, it will recalculate only when you press the CALC (F9) key rather than recalculating each time you make an entry. This will speed things up.

Q. Why are my legends truncated when I print my graphs?

A. Depending upon the total number of legends, there is a limit to the total number of characters you can print. For example, if you are making a stacked-bar graph and you want to have six legends, you have only 15 characters to use when naming the legends. In this case, you could have five legends that have two-character names and one legend with a five-character name. Follow these guidelines to keep legends from truncating.

BAR AND STACKED-BAR GRAPHS		LINE AND XY GRAPHS	
Total Number of Legends	**Total Characters**	**Total Number of Legends**	**Total Characters**
6	15	6	18
5	21	5	24
4	27	4	30
3	33	3	36
2	38	2	38
1	19	1	19

A vital part of the process is the hiring of enough support specialists to keep the time spent on hold from driving callers crazy. "Most of our callers call right in the middle of an application," Crummey says. "They can't wait. Our target is to leave people on hold for no longer than two minutes, and we hit it for the most part." That target translates into more than 50 people to handle the 6,000 demon reports Lotus gets every week.

Listening to these calls, one is struck by the resigned tone with which most begin. Some callers feel they have irreparably damaged the computer and call to confirm the terrible news before handing in their resignations. Others—a majority—clearly have been trying to coax some function (condensed print, for instance) out of their machines for hours. As a consequence, their expectations are very low. "You probably can't help me," a few say explicitly, and many others appear to feel that way.

"When people call, they often are at their wit's end," said a support specialist whom we'll identify as Anna. "They expect the worst, either because their problem has to be solved very quickly or because they have already tried every solution that they can imagine. I had one person call who had been trying to set up his printer for two months!

"And at other times, people feel terrible about having a problem at all," she continued. "They feel it reflects on them, on their ability to understand computers. When you get a call like this, you can tell right away, and your first job is to calm them down." And calm them down she does.

"Hello, *1-2-3* Support."

"Do I have to buy any hardware options to use an Okidata printer?"

"A lot of those printers," Anna said, "come with a plug-and-play chip. Now, we do not support the plug-and-play chip. However, we do support the plug-and-

Q. When I use the @IF function to compare two words, I don't seem to get the correct result. Is it *1-2-3*, or is it me?

A. In *1-2-3* all words (known as labels) have a value of zero. As a result, an @IF statement in *1-2-3* cannot distinguish between two words.

Q. Can @VLOOKUP (vertical table lookup) or @HLOOKUP (horizontal table lookup) formulas return a label instead of a value?

A. The @VLOOKUP and @HLOOKUP formulas can return only numeric values. Any labels contained in tables will return a value of zero.

Q. After I entered a number into a cell and displayed it to 15 decimal places, I noticed that there were some stray numbers in the 14th and 15th decimal places. How come?

A. Your PC uses floating-point arithmetic for calculations. Unfortunately, this fast, efficient method of handling numbers has one trade-off. It occasionally places a digit in the 14th or 15th decimal place of a number. In most cases, this has no effect on the results, but to be on the safe side, use the @ROUND function to regain precision.

Q. I have a formula in a cell. How can I change it to a value so that it will not recalculate when I change other values in the worksheet?

A. To change a formula to a value, place the cursor on the cell, press the EDIT key, the CALC key, and then press Return.

Q. How can I transfer a range of data from one worksheet to another without transferring the formulas that calculate that data?

A. First, use the /File Xtract Values command to create a file containing only the values from a range on a worksheet. Give this file a new name so that you do not overwrite your original file. The /File Xtract Values command does not change your original worksheet. It merely creates a new file containing a range of values instead of formulas.

Next, retrieve the worksheet into which you want to combine these values. Place the pointer in the upper-left corner of the range into which you would like to bring the data. Position the pointer carefully before executing the command, and then issue the /File Combine Copy Entire-File command to bring the data from the extracted file into the current worksheet file.

play cable and . . ."

The gentleman on the other end interrupted Anna with a groan, a great groan coming straight from the bottom of his belly. It seemed to say, "I think I've had just about all I can take of this nonsense."

"It certainly does get confusing," she sympathized. And then Anna laughed out loud. Her laugh seemed to say, "I know, I know. All this gobbledygook. What normal person can hope to keep it straight? A plug-and-play chip as opposed to a plug-and-play cable. I mean, who thinks this stuff up?"

The trauma dissolved on the spot. The caller re-

COMMON QUESTIONS AND ANSWERS ABOUT USING SYMPHONY

Q. I know that I can use *1-2-3* files with *Symphony*, but can I use my *Symphony* files with *1-2-3*?

A. No. *Symphony* Release 1 and 1.01 files cannot be read by *1-2-3*. As a result, you should make backup copies of *1-2-3* files before pulling them into *Symphony*.

Q. Sometimes my macros do not execute correctly, for example, when I use the {TYPE} command. Why is that?

A. Your worksheet probably contains a range name that is the same as one of *Symphony*'s macro names for special keys. A macro containing the {TYPE} command will not function correctly if a range named *type* exists on the spreadsheet.

Q. When I try to start *Symphony*, I get the following message: *Symphony cannot start due to an error while reading the SYMPHONY*.CMP *file*. What's happening?

A. This message indicates that your system does not have enough memory to run *Symphony*. A minimum of 320K of RAM is required.

Q. Why can't I change the interface settings on my Communications settings sheet?

A. When installing *Symphony*'s Communications drivers, you either neglected to specify an asynchronous communications port or specified an incorrect asynchronous communications port. You must reinstall *Symphony*'s communications driver programs and specify the correct asynchronous port.

Q. How do I load *1-2-3* files into *Symphony*?

A. To load *1-2-3* files into *Symphony*, you must change the *1-2-3* file extensions. Do so by exiting from *Symphony* into DOS. Then change the file extensions of the *1-2-3* files from WKS to WRK. Now use the SERVICES File Retrieve command to load these files into *Symphony*. Remember, once you have converted files for use in *Symphony*, they can no longer be used with *1-2-3*.

Q. Why do 10-line gaps regularly occur in the middle of all my printed documents?

A. You are not using the Align command to set the line count to the top of the page. When printing a document, use the SERVICES Print Align Go command to insure that line counts are synchronized with page breaks.

Q. When I try to load *Symphony* on my new IBM PC AT, I get the following error message: *Serial number not found*. I bought and paid for this copy of your program, so should I send my AT back to the manufacturer for repairs?

A. Not yet. Your IBM PC AT features a high-density floppy-disk drive. To read your *Symphony* serial number, the drive must be set for low-density operation. To set it, hit Return when your Access menu screen reappears or, with the *Symphony* disk installed in drive A, request a disk directory listing. Either technique will initiate low-density operation. Avoid this annoyance by placing a Dir A: command in your AUTOEXEC.BAT file.

Q. When I embed an initialization string in my document to alter a print font, the string code, not the print attribute, prints out on the hard copy. What should I do?

A. First, switch from a DOC window to a SHEET window. Then, in the leftmost column of the text area you want affected, enter two split vertical bars (¦¦) followed by a backslash (\ ). Now specify the three-digit ASCII code that corresponds to the print attribute you want. (See your printer manual for these codes.) Turn off special print attributes by specifying the appropriate ASCII codes at the end of the text section affected.

"So what am I supposed to do now?"

gained his spirits and composure, got a pencil, recorded her solution, and was off the line in less than a minute.

A PREMIUM ON SPEED

Listening to the Product Support lines, one also notices the speed with which Support recognizes and disposes of each caller's problem. The average call is reportedly handled in less than 10 minutes. On many calls the duration seems closer to 3 minutes. Some people do call with exotic and complicated problems—every support specialist spends 2½ hours of each shift doing research on these hard nuts—but the tough cases constitute a fraction of the questions. Despite the diversity of Lotus applications, a stable group of about 40 problems crop up in PCs everywhere, whether the computers are used to plan a beekeeping operation or to control some facet of the space-shuttle program.

"The calls we get do not really reflect every situation in which the programs are employed," a supervisor explains. "People call us at specific points—when they are pushing the borders of their experience and when they are under office pressure or a deadline.

"They also call when they are just getting into the program, so we get calls about installation. They call when they are just starting to use macros and when they are beginning to build really large, complicated spreadsheets. They also frantically call when they must have a report ready in an hour and don't have the time to read the manual. A lot of printer calls fall into that category."

EXPECTATION VERSUS REALITY

No one listening to these calls would dispute that the contrast between what the callers seem to anticipate and what they get is remarkable. When seeking help, most callers seem braced for the worst.

Instead, a Product Support specialist recognizes almost every problem, practically before a caller has finished describing it, and gives a step-by-step prescription to correct what's wrong. "When I detail a corrective procedure," one specialist explains, "I

imagine that I am faced with the same problem on my computer. Then, instead of entering the solution on my keyboard, I just redirect my thinking from my fingers to my mouth."

As often as not, the contrast between expectation and reality amazes people. The reaction from callers can be so intense that Product Support refuses to release the names of its staff—which is why they are unidentified in this article. A person who calls more than half convinced that he won't be able to describe his problem, and that if he can, Product Support won't know what to do about it, and that if they do, he won't understand the answer, suddenly finds that the support specialist knows what is wrong and exactly what to do about it. This tends to engender powerful confidence on the caller's part in the specialists' skills and judgment. It is common for callers to insist upon discussing subsequent problems with the specialist with whom they first spoke, long after that person has gone to work in another department.

Despite all the skill and magic dispensed by the staff of Product Support, every so often they are stumped by a problem none of them can solve.

"Hello, *1-2-3* Support. Can I help you?"

"I just bought your program, and it doesn't work. I put it in my computer and there's nothing there!"

"You mean your computer's not working?"

"No. It's working. I can see some numbers running down the left-hand side of the screen and there are some letters along the top."

"But that's what you're supposed to see."

"I am? Five hundred dollars and that's what I get? Numbers and letters?" Silence. "So what am I supposed to do now?" ■

COMMON QUESTIONS AND ANSWERS ABOUT USING JAZZ

Q. When I type a number into a cell on the *Jazz* worksheet, why does the cell display three dots instead of the number?

A. This occurs when the column in which the cell is located is not wide enough to display the entire number. If you have formatted the column for any format other than General, *Jazz* will display ellipses in the cell instead of the cell entry. This does not affect the way *Jazz* stores the number, however. To widen a column, drag the border line or choose Column Widths from the style menu and specify a wider setting.

Q. How do I insert page breaks when printing a worksheet?

A. It's easy. First, click the number or letter of the row or column where the break is to occur. Then select Set Page Break from the Range menu. A dotted line will appear where you've specified the page break.

Q. Can I control the size of the arrowheads that appear on my graphs?

A. Yes. Arrowhead size depends on the size of the GRAPH window. When you vary the window size, the arrowhead size changes accordingly.

Q. Choosing Underline from the Style menu allows me to underline my text, but I can't seem to underline blank spaces between words. Is there a way to do this?

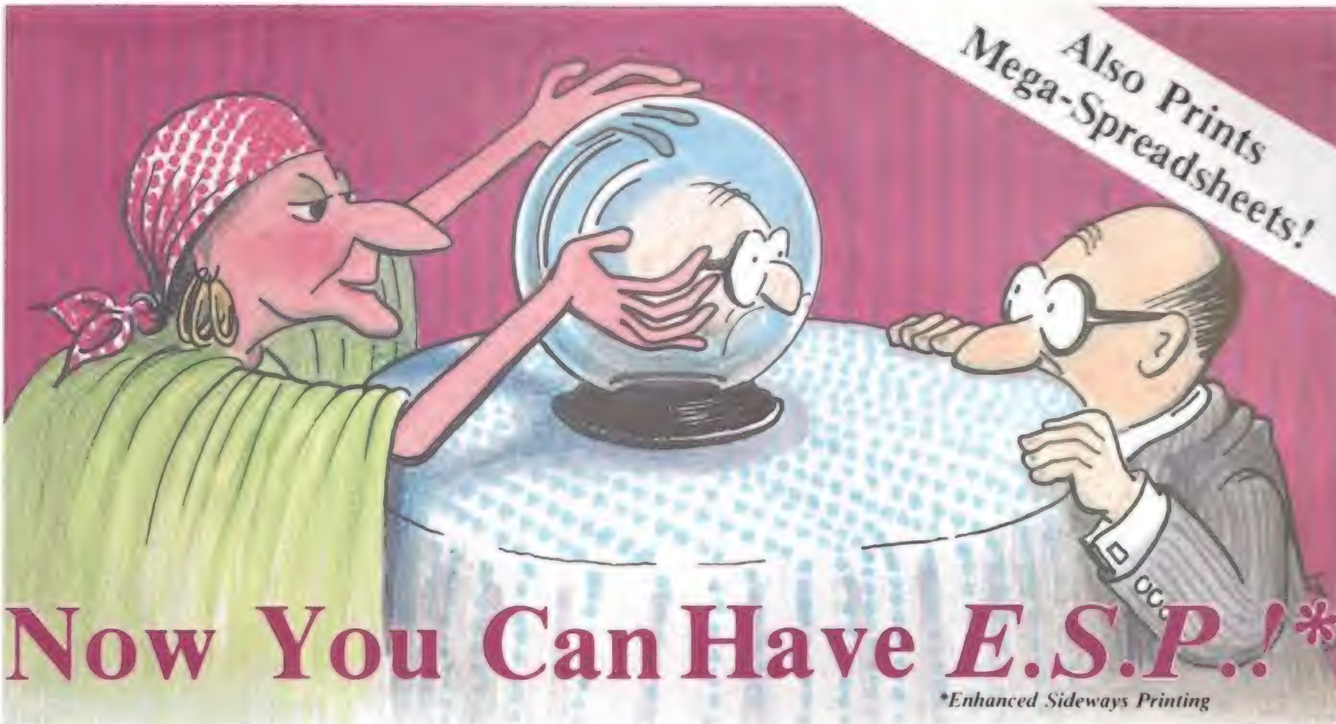
A. To underline a blank space, select Underline from the Style menu, hold down the Option key, and press the space bar. To underline a space in previously typed text, select the space to be underlined, select Underline from the Style menu, and then hold down the Option key and press the space bar.

Q. Does *Jazz* run on the Macintosh XL?

A. *Jazz* does run on the Macintosh XL, but you must have the latest version of *MacWorks XL* software. The only way to verify whether or not you have the latest version is to check the serial number on the back of the *MacWorks* disk. The correct version will have a serial number that reads 6820087C.

Q. Does *Jazz* run on hard disks?

A. Yes, *Jazz* runs on both the Tecmar and HyperDrive hard disks.



Now You Can Have *E.S.P.!**

***Enhanced Sideways Printing**

People have been wishing for years that they could print their spreadsheets as nicely as they could print all the rest of their documents. Fast. With tall characters. Or small ones. With presentation quality. With the IBM graphic characters.

But most of all, they've wished that they could print them the way they really are: wide.

How do we know all this? We read their minds. We have ESP.

Not Extra Sensory Perception. Enhanced Sideways Printing. With *Side*Step.

*Side*Step

*Side*Step lets your dot matrix printer print your spreadsheet, project management schedule — any ASCII text file — sideways rather than upright. *Side*Step actually rotates your document 90 degrees. The result is a document of virtually any width printed on one continuous sheet of paper. No more cut and paste. No more taping together pages.

Print Wall Charts. Or Small Charts

*Side*Step lets you select from 18 combinations of font size and print quality: print your spreadsheet with double-strike or emphasized printing for presentation quality. (In fact, letter quality with Toshiba printers.) *Side*Step prints the standard font you're used to, but you can also select from tall and compressed fonts as well.

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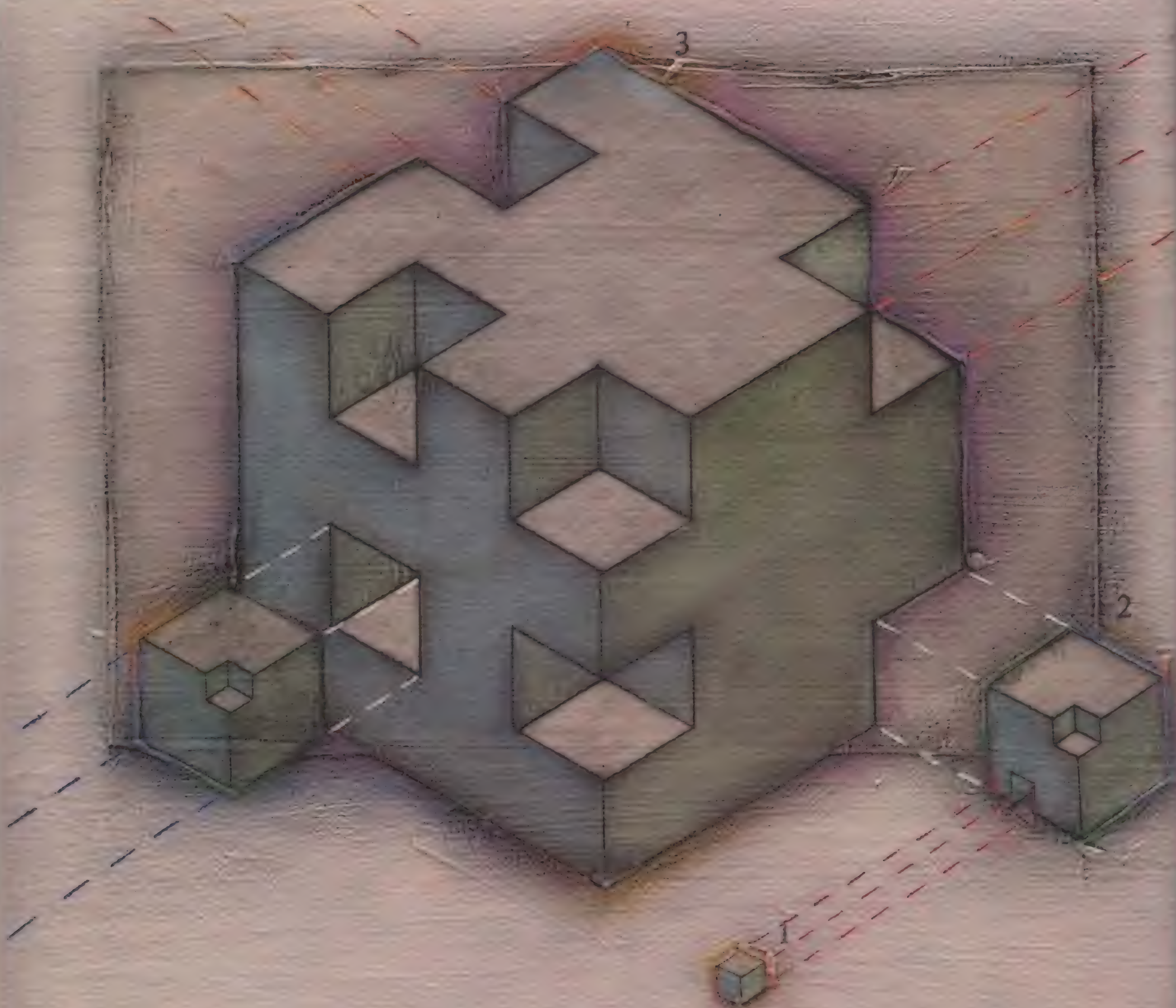

Cover Story

WRITING STRUCTURED MACROS

BY TIMOTHY BERRY

Do your *1-2-3* and *Symphony* macros resemble spaghetti? Do you use stream-of-consciousness to write serpentine lines of macro instructions? Is it easier to rewrite than to modify your macros? If so, the techniques of structured programming can help you unscramble and organize your macros. Even if you write solid, well-designed, functional macros, giving them structure makes it easier to modify and document them.

Structured programming is nothing more than bringing common sense to the process of writing computer instructions. It entails organizing instructions and procedures into modules that you can use as the building blocks of a larger macro. You can write and test as well as expand and modify each module separately. Most of the problems that macros are designed to solve contain logically definable parts, such as input and output routines, menu presentations, and calculations. Structured programming lets you build these parts separately and combine them to form a sophisticated macro. An advantage of structured programming is that you can draft others to write and test macro segments for you. Doing so reduces the time usually spent debugging large macros. When properly organized and administered, this team approach to macro writing is quite satisfying.

Breaking complex macros into reusable subroutines lets you mix and match command sequences and spot errors quickly.

PROVIDING STRUCTURE

You can force almost any computer programming language to exhibit structure. Even BASIC, notorious for its lack of structure and long lines of winding logic linked by confusing Goto and If-Then statements can be conquered. In some BASIC programs, only the author has a clear idea of what is going on at any given point in the code. On the other hand, PASCAL programmers praise PASCAL for its structure, which makes the writing of clear, logically organized programs almost second nature. In reality, BASIC programs may or may not be structured and PASCAL programs may or may not be confusing. This is also true of macros. The structure emerges as you write a macro; it is not inherent in the language.

Figure 1 shows two macros that calculate compound average growth rates. This common financial calculation can be broken into the following components: the input of variables—starting and ending values and a number of periods; the calculation of intermediate values; and the output of results. A *1-2-3* or *Symphony* macro written to solve this problem can be divided into similar parts or subroutines.

An unstructured *1-2-3* macro that calculates compound average growth rates appears in figure 1a. Only after completing a detailed reading of each statement in the macro will you understand what is going on. A structured version of the same program appears in figure 1b. Here the macro appears as individual modules, and each module is a subroutine. Each subroutine is placed in a named range, and subroutines are used as needed. The macro named *\m* oversees the entire operation, using subroutines named *input1st, inputlast, inputpeds,* and *cagrcalc* during execution. This macro depends on several key elements for its structure. The most important is the subroutine call.

In a subroutine call, groups of macro instructions are summoned for use by the main or control segment of a macro. These groups of instructions are identified by specific range names such as *input1st* and *inputlast.* Once subroutines are executed, they return control to the main macro with a /XR command. If you want a choice of functions within a macro, you can include a subroutine that provides branching to various macro segments. Such a subroutine presents a choice of menu options. Once you make a choice, the branching subroutine directs program flow accordingly.

The structured macro in figure 1b illustrates how range names combined with subroutines break simple programs into logically definable blocks. Each of the subroutines included in the macro is identified by a range name created by using the /Range Name Labels Right command. The macro segment named *\m* calls other subroutines by range name with the following command: /XCrange name. When a subroutine is complete, it returns to the macro named *\m* by executing the /XR command. For example, when you run the macro named *\m*, it calls the *input1st* subroutine, which prompts you for the first value (/XNinput starting value~~). Once you supply this value, the subroutine assigns the range name *first* to the cell holding the value so that it can be used in a later calculation. Then the /XR command ends the subroutine and the *\m* macro resumes control. The main pro-

Timothy Berry is the president of Infoplan, a Palo Alto, California, developer of custom templates. He is the author of Working Smart with Electronic Spreadsheets, *published by Hayden Books.*

DAVID LESH

MACROS CAN BE DIVIDED INTO MODULES AND EACH MODULE TREATED AS A SUBROUTINE.

```
     A       B       C       D       E       F
1    /XNInput starting value~~
2    {RIGHT}
3    /XNInput final value~~
4    {RIGHT}
5    /XNInput number of periods~~
6    {RIGHT}
7    (({LEFT}{LEFT}/{LEFT}{LEFT}{LEFT})^(1/({LEFT}-1)))-1~
8
9
10
11
12
13
14
15
16
17
18
```

FIGURE 1a

```
     H            I          J          K          L
1    \m           /XCinput1st~{RIGHT}
2                 /XCinputlast~{RIGHT}
3                 /XCinputpeds~{RIGHT}
4                 /XCcagrcalc~
5
6    input1st     /XNInput starting value~~
7                 /RNCfirst~~
8                 /XR
9
10   inputlast    /XNInput final value~~
11                /RNClast~~
12                /XR
13
14   inputpeds    /XNInput number of periods~~
15                /RNCperiods~~
16                /XR
17
18   cagrcalc     ((last/first)^(1/(periods-1)))-1~
```

FIGURE 1b

FIGURE 1. The essence of a structured approach to macro programming is illustrated by this typical financial calculation. Here compound average growth rate is determined by a macro. The unstructured macro in 1a provides few clues as to what's going on. Its straight-line nature makes it difficult to follow the logic. The structured version of the same macro in 1b clearly delineates macro segments by grouping them according to function and assigning descriptive range names to each group. The segment named *m* controls the macro's overall flow of logic by calling subroutines as needed. Each subroutine ends with an instruction that returns control to the main macro segment. Subroutines are identified with range names rather than cell locations to provide them with mobility, self-documentation, and a measure of protection.

gram segment then calls the *inputlast* subroutine with the /XCinputlast instruction. This subroutine calling procedure is repeated as each instruction in the main body of *m* is executed.

Although *1-2-3* macros can identify and call subroutines by cell locations (for example, /XCM204), there are good reasons for using range names rather than cell addresses as subroutine names. First, you can keep track of range names. Second, when you treat subroutines as named ranges, you can easily change their worksheet location. Third, named ranges are not affected by the insertion or deletion of rows and columns. You can move named ranges to out-of-the-way worksheet locations, and *1-2-3* can still find them when necessary. If you give subroutines exact cell locations, *1-2-3* may be able to call them only once during the course of executing a macro.

EXPANDING STRUCTURED MACROS

It's clear that writing structured macros requires a little more effort than writing unstructured ones. Is it worth the trouble? In most cases, yes. Even when you are writing simple, one-line macros, doing so in a structured manner will allow you to expand on a solid, reusable base of macro routines. Eventually, you can create a library of routines to mix and match as your spreadsheet calculations require. For example, look at figure 2.

Here a few additional subroutines give our initial structured macro some extra power. These subroutines enable the macro to check the *periods* value you specify before running the macro. The *periods* value is the time over which the growth rate is calculated. After accepting input for the first value, the macro calls the *subright* subroutine, which moves the cell pointer to the right (*periods*-1). This produces a block of cells equal to the number of periods. Once this block has been generated, the macro accepts the last value and proceeds with computation.

As computation proceeds, the expanded macro jumps back to the cells between *first* and *last* and fills in intermediate values. The output is:

	A	B	C	D	E	F	G
1	100.0	131.6	173.2	228.0	300.0	31.6%	
2							

Because the original version of this macro was well structured, these changes are relatively easy to make. With slight modifications to the main body of the original macro and the subroutine named *inputpeds*, the added subroutines *init, subright, subform*, and *subcopy* do the trick.

STRUCTURING WITH MENUS

Having built the macro shown in figure 2, there is a quick and almost easy progression to the macro

MACRO PROGRAM FUNCTIONS CAN BE LINKED BY A MENU SUBROUTINE THAT PRESENTS A CHOICE OF OPTIONS.

```
          A              B          C          D          E          F
1    \m             /XCinputpeds~
2                   /XCinput1st~
3                   /XCsubright~
4                   /XCinputlast~{RIGHT}
5                   /XCcagrcalc~
6                   /XCsubform~
7                   /XCsubcopy~
8                   /XCinit~
9
10   cagrcalc       ((last/first)^(1/(periods-1)))-1~{EDIT}{CALC}~
11                  /RFP~~/RNCrate~~
12                  /XR
13
14   inputpeds      /XI(periods>1#AND#periods<25)~/XR
15                  /XNEnter number of periods (2-24): ~periods~
16                  /XGinputpeds~
17
18   init           /RNDfirst~
19                  /RNDlast~
20                  /RNDrate~
21                  /XR
22
23   subright       {RIGHT}/XIperiods=2~/XR
24                  {RIGHT}/XIperiods=3~/XR
25                  {RIGHT}/XIperiods=4~/XR
26                  {RIGHT}/XIperiods=5~/XR
27                  {RIGHT}/XIperiods=6~/XR
28                  {RIGHT}/XIperiods=7~/XR
29                  {RIGHT}/XIperiods=8~/XR
30                  {RIGHT}/XIperiods=9~/XR
31                  {RIGHT}/XIperiods=10~/XR
32                  {RIGHT}/XIperiods=11~/XR
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38                  {RIGHT}/XIperiods=17~/XR
39                  {RIGHT}/XIperiods=18~/XR
40                  {RIGHT}/XIperiods=19~/XR
41                  {RIGHT}/XIperiods=20~/XR
42                  {RIGHT}/XIperiods=21~/XR
43                  {RIGHT}/XIperiods=22~/XR
44                  {RIGHT}/XIperiods=23~/XR
45                  {RIGHT}/XIperiods=24~/XR
46
47   subform        {GOTO}first~
48                  {RIGHT}
49                  +{LEFT}*(1+$rate)~/RF,1~~
50                  /XR
51
52   subcopy        /C~.{END}{RIGHT}{LEFT}~
53                  /XR
54
55   periods              6
```

FIGURE 2. The original growth rate macro can be expanded by additional subroutines. Adding the *init*, *subright*, *subform*, and *subcopy* routines allows it to display the intermediate values calculated in the course of determining final values. The *subright* routine produces a block of cells equal to the number of periods. By jumping back to the cells between *first* and *last* in the *init* subroutine as the macro executes, intermediate values are recorded and displayed. Besides adding subroutines, slight modification of the *main* and *inputpeds* subroutines is also required.

```
          A              B          C          D          E          F
58   \n             /XMstartup~
59
60   startup        Ends       GRate
61                  Define thDefine starting point and growth rate
62                  /XG\m~     /XGgrate~
63
64   grate          /XCinputpeds~
65                  /XCinput1st~
66                  /XCsubright~
67                  /RNClast~~{RIGHT}
68                  /XCinputrate~
69                  /XCsubform~
70                  /XCsubcopy~
71                  /XCinit~
72
73   inputrate      /XNInput growth rate (decimal) ~~
74                  /RNCrate~~/RFP~~
75                  /XR
```

FIGURE 3. Menu-driven macro program branching is achieved by adding these additional subroutines to the existing macro. Here you will be prompted to choose between two methods of building a projection row. When you start the macro by pressing Alt-N, you are offered two options: Ends and GRate. Selecting Ends causes control to shift to the original macro routine (*m*), while selecting GRate (growth rate) shifts control to the instructions in the routine named *grate*. The *inputrate* subroutine is added to accept the initial growth rate figure.

shown in figure 3. This program lets you choose between two ways of building a projection row. The first option defines starting and ending points, calculates a growth rate, then fills in the intermediate values. The second option prompts for a starting point and for a growth or interest rate, then projects from the starting point to the end of the period using that rate. The second row-building option of figure 3 specifying a growth rate is built almost entirely from subroutines written and tested for the macro in figure 2. Only the *inputrate* subroutine had to be added.

These two program options are linked by a menu that presents a choice of program functions. The /XM command in figure 3 provides a menu with the two choices Ends and GRate. If you choose Ends, the macro processes the instruction /XG\m contained in cell B62. This transfers control to the original macro named *m* (shown in figure 2). If GRate (growth rate) is chosen, the macro executes the commands in the routine named *grate* in figure 3. Again, additional program features are added to existing macros as subroutines rather than writing entire macros from scratch.

It may take an extra measure of discipline to think of macros as confederations of independent subroutines. And it may seem farfetched to view your fellow spreadsheet creators as members of a corporate macro-writing team. Nevertheless, both concepts are valid. As the tasks you commission your macros to perform become more complex, the advantages of a structured approach to macro programming become increasingly evident. ■

TIPS FOR BETTER WORK

BY FRITZ GRUPE

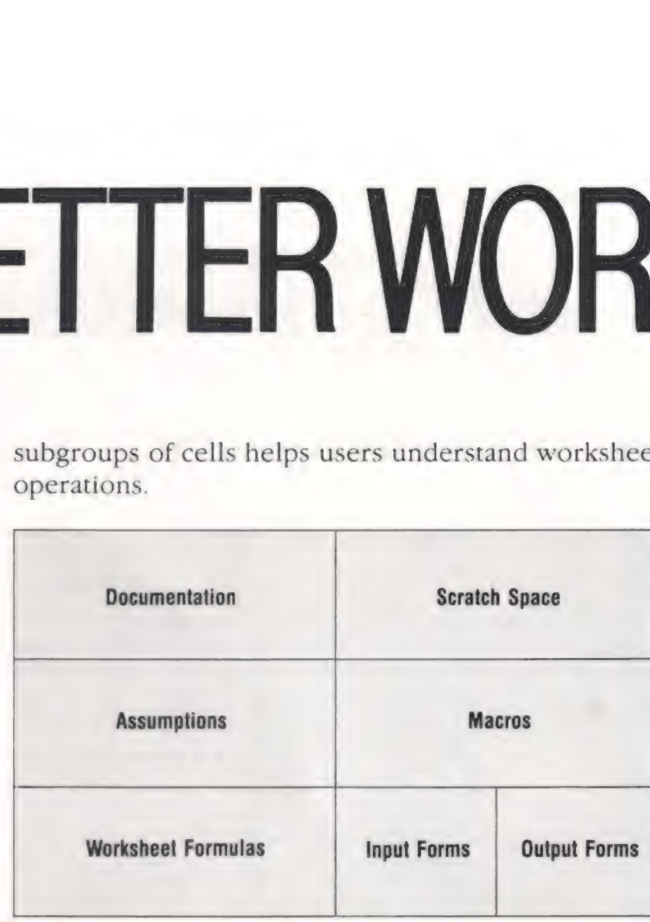
Whether you create worksheet models for yourself or for others, documenting what you do is vital. It's best to provide two kinds of worksheet documentation: external and internal. External documentation is written material that accompanies your worksheet; it describes how to run and use your template or model. Internal documentation is information within the worksheet that enables someone to understand how your worksheet functions or to modify it to achieve specific goals.

EXTERNAL DOCUMENTATION

The written material need be only a few pages in length, but it should describe the worksheet in sufficient detail so that users can grasp its scope and ground rules. When composing the written documentation, keep the following guidelines in mind.

1 DESCRIBE THE PURPOSE of your worksheet in the written documentation. Users do not live by formulas alone. A brief description of how your worksheet operates allows users to grasp the fundamental concepts of your design quickly. Be sure to mention any hidden assumptions you make within the worksheet, such as future interest rates, depreciation schedules, or seasonally adjusted economic indicators.

2 SUPPLY A MAP of the worksheet similar to the one in the "Worksheet Map." It is often difficult to envision the overall structure of a large worksheet, much less describe it in words. Supplying a worksheet map that illustrates key cells, ranges where macros reside, and subgroups of cells helps users understand worksheet operations.



WORKSHEET MAP. To help others understand your model's structure and function, provide a map of the overall worksheet layout in the written documentation. If you use a companywide worksheet format that allocates blocks of cells for specific functions, worksheet operations are easier to envision. The scheme depicted here is just one of many possibilities.

3 SUPPLY TABLES of cell contents and formulas. Lists of cell addresses and contents are invaluable for determining whether formulas have been altered accidentally or copied incorrectly. In addition, cell content and formula tables allow experienced users to analyze worksheet operations quickly. In *1-2-3* use the /Print Printer Options Other Cell-Formulas command (in *Symphony*, SERVICES Print Settings Other Format Cell-Formulas) to create cell-by-cell lists.

4 PROVIDE A BRIEF EXPLANATION of how complex formulas function. Many formulas are too long to be displayed on-screen, especially formulas using cell addresses for computation. Supply descriptions of complex formulas that specify what is being calculated, where the data is drawn from, and how the results should look.

Fritz Grupe is the Campus Computing Services Coordinator at the University of Nevada in Reno.

Whether you develop applications for others or simply share templates with colleagues, follow these 21 tips to make your worksheets more useful.

SHEET DOCUMENTATION

5 PROVIDE SAMPLE DATA. When you include a sample worksheet based on test data in the documentation, users see what computation results will look like. Test data also permits the user to confirm that everything is working correctly after a modification is made. Specifying how test data is used to confirm accuracy provides the user with experience in model manipulation as well as with confidence in worksheet logic.

6 CITE ANY PROBLEMS that novice users may encounter, then suggest how these problems can be solved. Experienced users may want to modify your model. Alert them to potential trouble spots.

7 PROVIDE BACKGROUND on the source of your worksheet logic. Some worksheet solution methods are derived from textbooks, others from personal experience or economic theory. Those who use your worksheets will benefit from knowing what you based your methods on. Footnotes, parenthetical references, and a bibliography can be included in written documentation. Providing such source material enables users to do their own research if they need more information.

8 INDICATE THE DATE the worksheet was released and the version or release number of the software used to create it. The date of the most recent worksheet revision and the name of the person responsible for it should also be included. Including these simple additions can save considerable time when things go wrong.

9 LIST ALL RANGE NAMES used in a worksheet. If you provide range names and definitions in the written documentation, others can easily build on your work. Using range names instead of cell addresses also helps ensure that alterations to range endpoints are consistently reflected throughout a worksheet. In addition, it facilitates the construction of new functions using these named ranges.

10 LIST AND DESCRIBE all macros. Worksheets that include macros should include descriptions of what they do and how they work. If novices will be using the worksheet, describe how to invoke the macros.

11 IDENTIFY CLEARLY THE WORKSHEET file name, any volume labels, and the disk name in the written documentation. This helps users locate the files they need. If your worksheet extracts, erases, or imports files, identify these and specify where they can be found. Disk labels should identify the files residing on each disk.

INTERNAL DOCUMENTATION

Stories of programs that could not be maintained after the original programmer left the company are common because one programmer's methods may not be decipherable by someone else. A similar situation can exist with worksheets. Avoid making yourself irreplaceable by supplying adequate on-sheet documentation with each of your worksheets or templates. Consider incorporating the following methods in your next worksheet.

12 ADOPT A CONSISTENT, companywide worksheet organization that reserves blocks of the worksheet for specific purposes. The layout shown in the "Worksheet Map" is one of many possibilities available. No matter what worksheet layout you use as a standard, apply it consistently.

13 USE FORMATS and labels consistently. Place headings in the same locations in each worksheet. Use repeating labels to underline important areas of each worksheet. Underline column headings with the minus sign and underline subtotals and totals with the equal sign. Remember that data and underlining cannot occupy the same cells. Format character information with built-in centering, and avoid formatting with blank characters. Blanks can adversely affect database operations.

14 DISTINGUISH MACRO COMMANDS from range names and cell addresses when writing macros. Since macros are written in command shorthand, they are often difficult to interpret. One approach is to use uppercase for commands and lowercase for cell addresses and range names. For example, /RNCinput~~ is easier to interpret than /RNCINPUT~~.

15 IDENTIFY ALL INDEPENDENT VARIABLES and assumptions used in calculations. These should appear in a table and be identified by name and assigned value. You may also want to create a special input area on your worksheet for independent variables. For example, your company's projected rate of sales growth could be placed in an area titled *Input* and presented as *Proj. Sales Growth (%): xx%*.

16 IDENTIFY ALL DEPENDENT VARIABLES on the worksheet and indicate which independent variables were used to calculate them. While many users need to know little about how a model functions, they may want to change model assumptions during what-if analysis. Make this task easier by supplying adequate information on the variables being used, their locations, and any default values assigned to them.

17 INCLUDE THE WORKSHEET FILE NAME, any volume labels, and the name of the disk within the worksheet. Reserve a few cells at the top of each worksheet for this information so that whenever a copy of the worksheet is printed, a written record of the name and location of the file used to create it will be supplied. For example, include information such as the following on each worksheet: FILE NAME: 1985 Profit Margins, VOLUME LABEL: Sales85, DISK TITLE: Sales Projections.

18 USE COMPLETE RANGE NAMES, row and column headings, labels, and comment lines whenever possible. Incurring the wrath of users is the threat that keeps applications developers from identifying a variable as *X* when *Sales* could be used instead. Seldom is memory so limited that you can't use complete worksheet labels to indicate the content of a cell, range, row, or column. Meaningful range names are also beneficial, even when denoting a single cell. Row and column headings should be as descriptive as possible, even if two or three cells are required. For example, *Part No.* is more desirable than #.

19 RESERVE GROUPS OF CELLS for comments within a worksheet. A block of 10 or 20 cells can include an explanation of how the worksheet works, the name of the person who created the worksheet, and the last revision date.

20 DOCUMENT ALL MACROS within the worksheet. Complicated macros are difficult to decipher, so place a title line above macros indicating what the macro does. For instance, *\aPrint Database* is more informative than *\a*. Macros performing multiple functions are especially hard to follow. If they fail to function properly, users need to be able to analyze them quickly. Use a three-column format with range names to the left, macro codes in the center, and comment lines to the right. For example:

```
        A       B         C          D          E          F
1  Macro to Replace Sales Figure
2
3  \b   /C~targ~    Copy sales total to cell targ
4       /RFC2~      Format as currency, 2 decimal places
5       {DOWN}      Go to next cell down
```

Avoid creating complex lines of macro instructions, and break macros up over multiple cells so that logically related instructions are located on the same line. Keep these related sequences together and place comments to the right of instructions.

21 INCLUDE DESCRIPTIONS of key formulas. In areas of the worksheet in which complex formulas are used, display the formulas as text in blocks. Do this by placing a label prefix before the formula, copy the prefix and formula to the comment area, then return to the original formula cell to edit the label prefix. In the comment area, explain what the formula calculates and how it works. ■

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DISPLAYING LEADING ZEROS

Q. I need to print numbers showing leading zeros. For example, I need to show 1 as 0001, 10 as 0010, etc. These numbers are in the area of the worksheet that I print as my final report, and since they are not used in any additional calculations, I could turn them into labels if that would help.

Buddy Woods
Magnolia Finishing Plant
Blacksburg, South Carolina

A. Here's a partial answer, and we'll ask other readers to help fill the gap. In each appropriate cell of the area to be printed, start typing a formula to divide each source number by 10,000. But instead of pressing Return, press EDIT then CALC to convert the formula into a hard number. The number will display a zero followed by a decimal point and then four digits (0.0001). You are still in Edit mode, so press Home to move the cursor to the first character, enter a label prefix (') to turn the value into a label, press Delete two times to erase the preceding zero and the decimal point. Finally, press Return and you have your display.

But here's the problem: If the source number ends with a zero, the EDIT-CALC process will drop the trailing zeros, and they will never appear in the final label. You could manually replace the missing zeros, but let's have a contest to find a better way. We'll send a Lotus flight bag and $25 to the people who submit the best solutions. The decision of the LOTUS judges is final. Send your letters to August Contest, c/o Resources Department, P.O. Box 9123, Cambridge, MA 02139-9123.

NAMING VERSUS SAVING GRAPHS

Q. I have saved several graphs in a worksheet. When I go to DOS and enter *dir*, it shows that all of the graphs are on the disk. But when I'm in the worksheet and select View, the only graph I ever see is the last one constructed. What am I doing wrong?

John Robison
Kennet, Missouri

A. When you are in the Graph menu and select Image-Save (*Symphony*) or Save (*1-2-3*), you extract a copy of the graph from the worksheet and send it into a separate picture file with a PIC file extension. You can retrieve and print PIC files with the PrintGraph program, but you cannot retrieve these files back into your worksheet.

To keep a graph connected to your worksheet, within the Graph menu select Name Create (in *Symphony*, it's found in the 2nd-Settings menu). You can name as many graphs as you like; they will all remain associated with the spreadsheet if you have saved the file on disk after the graphs have been named. Previously named graphs can be made current and viewed by selecting Name Use or, in *Symphony*, by attaching the graph to a GRAPH window.

PRINTING MULTIPLE RANGES

Q. Within *1-2-3*, I cannot find any way to mark a series of ranges to be sequentially printed without my intervention. It seems I must print one page at a time.

Linda M. Bonvie
New Britain, Connecticut

A. To print more than one range with a single command, you must create a self-modifying macro. Give each of the ranges you wish to print a range name, then list those names down a column. *1-2-3* users must do this manually. *Symphony* users can select MENU Range Name Table to create a table of the worksheet's named ranges. Create a looping macro that uses each of the range names sequentially as the print range.

YEAR-TO-DATE CONSOLIDATION

Q. Is there a way to enter a new value in cell A1, have that value added to another value in B1, and have the total entered in B1? I would like to put in a new monthly figure in A1 and have it added to a cumulative year-to-date amount in B1.

Jim Anderson
University of Wisconsin
Platteville, Wisconsin

A. There are several solutions to this problem. Assume that your input cell is A1 and the cumulative total goes in B1. Each time you enter a new figure into A1, you would then point to B1, type @SUM(then type or point to the range A1..B1, type) , press CALC, then press Return. This process could also be automated using the /XN (*1-2-3*) or the {GET-NUMBER} (*Symphony*) macro command statements. *Symphony* users could also use the {LET} statement to add the input cell to the cumulative total cell.

A second method is to enter the new monthly figure in the appropriate cell. Select File Xtract Value, enter a file name such as TEMP, and point to the monthly figure. Move the pointer to the year-to-date cell. Select File Combine Add Entire-File (*Symphony* users select Ignore Values), then point to TEMP. The incoming monthly figure will be added to the value, the old year-to-date amount, already in the cell. You can automate this process with a macro:

1-2-3	Symphony
'/FXVtemp~{?}~{?}	'{S}FXVtemp~{?}~{?}
'/FCAEtemp~	'{S}FCAEIVtemp~

If you arrange your worksheets carefully, you can use the Xtract/Combine

system to combine an entire month of figures into a year-to-date summary or to consolidate reports from many branches of the same company. To combine a named range or an entire worksheet into another worksheet, place the cell pointer at the upper-left corner of the area into which you want the incoming data to appear and select the /File Combine Add command. In *1-2-3*, the current value of number and formula cells in the incoming worksheet is added to any blank or number cell that value falls on in the current worksheet. The incoming cells are ignored if they overlap cells containing labels or formulas. Incoming range names and cell formats are ignored. Only the cell contents are combined.

Symphony allows you to choose to bring in range names and formulas along with incoming data.

CONTROLLING PAGE NUMBERS

Q. I have a very large worksheet containing many small parts, each of which I want to print on a separate page, numbered sequentially. I selected /Print Printer Options Header (Print Settings Page Header in *Symphony*) and entered *page #*. However, each page gets the number 1. I have written a macro to control the printing order of the separate ranges, but I can't figure out how to solve this problem.

John Sobotincic
Erie, Pennsylvania

A. Modify your macro so that it does not leave the Print menu after printing each range. After selecting Go Page (Page-Advance in *Symphony*), immediately select Range (Settings Source in *Symphony*). As long as you do not select Align or the final Quit, the program's internal page counter will count and add numbers sequentially.

TOP LABELS

Q. I want to have column headings at the top of each page, but I can't enter a range of cells to use as the header. Is there a way around this limitation?

Rand Coffman
Weyers Cave, Virginia

A. Select /Print Printer Options Borders Rows in *1-2-3* or SERVICES Print Settings Other Top-Labels in *Symphony*, then point to the row of labels you wish to use as column headings. The portion of the Top-Label row located in the same columns as your print range will be printed at the top of each page above the associated column of data.

KEEPING TRACK OF RANGE NAMES

Q. After I finish creating a large *1-2-3* worksheet, I document it by printing the macros, formula areas, and copies of the output reports. But I have not found a method of printing the range names and their cell addresses. This makes it harder to return to a previously created worksheet for further testing or development. Is there a way around this problem?

Judy Bono
Belmont, California

A. Reserve an area of your worksheet for documenting range names. Give this area a range name, such as *range-names*. Every time you create a new named range, go to this area and enter the name and definition. A quick way to jump to this area is to press GOTO, then press NAME. A menu of range names will be displayed, and you can point to the desired destination.

Symphony users can automatically insert a list of range names and locations within their spreadsheet with the MENU Range Name Table command.

SYMPHONY

SYMPHONY 1.1

Q. Why does it take so long to retrieve my *1-2-3* and *Symphony* 1.0 files into my upgraded version of *Symphony* 1.1?

Samuel Beatson
Air Comfort Inc
Burlington, Vermont

A. Release 1.1 of *Symphony* has a new, more efficient memory-use system. Called sparse matrix, this system lets you create much bigger worksheets using the same amount of RAM. The first time you retrieve your old files into *Symphony* 1.1, the program revises the memory allocation to fit the new system. This explains the longer initial loading time. But all future retrievals in *Symphony* 1.1 will be as fast or faster than in *1-2-3* and *Symphony* 1.0.

CIRCLE 133 ON READER SERVICE CARD

JAZZ

SYLK FILE CONVERSION

Q. I have been using *Jazz*'s File Conversion utility to convert a *Multiplan* SYLK worksheet into a *Jazz* document, but *Jazz* keeps freezing on me. Am I doing something wrong?

Judy Knox
Buena Vista, Colorado

A. This occurs if you try to convert a SYLK worksheet in which an entire column, as opposed to a range of cells, has been formatted. To correct this situation, open the SYLK file using *Jazz*'s word processor or any other text editor. All column-formatting command lines are near the top of the file and have the form *F;. . . ;Cn* in which *n* represents the column number from 1 to 64. These lines immediately precede a line that starts with the letter B.

```
                        ID;PMP;N
                        F;DB0G10
                        F;W4 4 12
                        F;W11 11 13
                        F;W13 13 12
                    ->  F;$2G;C5
Lines to be deleted ->  F;F%2G;C4
                    ->  F;FE2G;C2
                        B;Y77;X19
                        C;Y1;X1;N;K12
                        C;X2;K34
```

SYLK file opened in *Jazz* word processor

Delete all the column-format command lines, and, being sure to select the Text Only option in the Save As . . . dialog box, save the SYLK file. If the SYLK file is very large, you may need to quit and then reenter *Jazz* to free enough memory to convert the modified SYLK file. Finally, choose Convert . . . from the Apple menu and convert the file as usual. You must manually restore the format of any columns once the conversion is complete.

MAC XL LOADING PROBLEM

Q. I have a Macintosh XL, which is supposed to run *Jazz*. However, I can't load *Jazz* from either my hard disk or from the program disk in my internal drive. I keep getting the message *Please insert original Program Disk.*

Jill Goldstein
Phoenix, Arizona

A. To run *Jazz*, you need the latest revision of *MacWorks XL* software installed on your hard disk. The part number on your *MacWorks* disk must read 6820087C. If the last letter of the *MacWorks* disk part number is A or B, you do not have the latest revision. In addition, the part number of your *MacWorks* system disk must be 6820103B. If you own a Mac XL with an old version of *MacWorks*, Apple will give you a free upgrade. Lisa owners who purchased *MacWorks* software must send their original *MacWorks* backup disk and $29 to Apple Computer Processing Center, MacWorks XL Upgrade Program, P.O. Box 6272, San Jose, CA 95120. ■

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MORE TIPS ON USING LOTUS PRODUCTS

BY STEVEN E. MILLER

CONTEST WINNERS

The June issue contained a tip for using multiple exclusion criteria in a single field when you are doing a database extraction. The steps were to enter one exclusion criterion, preceded by a tilde (such as ~red) under the desired field name in the Criterion range, perform the extraction, redefine the Output range as a new Input range, then repeat the process with an additional exclusion criterion. Although this works, we began a contest to find a less cumbersome method.

We have thus far received more than 70 answers, representing a wide range of creative solutions. Many people suggested creating a new field, perhaps called Exclude, and inserting a character in that field within each record that you wanted to exclude. It is then simple to use that character as the criterion to perform an extraction. Although this is a solution for small databases, the judges, whose opinion is final, decided that this would create too much extra work in large databases.

Symphony users have no problem with multiple exclusion because of the program's ability to compute with numbers and labels. Two types of *Symphony* criterion formulas were submitted. The first type tied a series of not-equal logical formulas together with the logical #AND# statement:

+fieldname<>"label1"#AND#
fieldname<>"label2"#AND# . . .

The labels, or strings, must be enclosed in quotation marks. This system works even if the criterion combined labels and values, as in:

#AND#fieldname<>value1#AND#
fieldname<>"label1" . . .

The value does not need surrounding quotation marks.

Jeff Blackmer of Big Rapids, Michigan; Bruce Green of Grand Forks, North Dakota; Andy Hawkins of New York City; and Sandie O'Toole of St. Louis, Missouri, all suggested this approach.

The second type of formula starts with a logical #NOT# followed by parentheses containing a series of equivalency statements together with a logical #OR#. Again *Symphony* users could combine labels and values. Charles Hoke of South Bend, Indiana, submitted this method:

#NOT#(fieldname="label1"#OR#
fieldname="label2"#OR# . . .)

All these people are winners in the newly created *Symphony* subcategory of the contest.

Several people from the same group, plus Jan Warlick of Cheyenne, Wyoming, pointed out that these kinds of formulas work in *1-2-3* as long as the extraction criteria are numeric. But since *1-2-3* evaluates all labels as zero, you cannot use labels in *1-2-3* criterion formulas.

The winning solution in the overall contest works in both *1-2-3* and *Symphony* and with numeric and label criteria. It is simple, elegant, and quick. The trick is to delete rather than extract.

Here are the steps. Save the file. Enter the items you want to use as the basis for the deletion under the appropriate field name in the Criterion range. Do not precede the items with a tilde. Put one item in each row and expand the Criterion range to include all needed rows. Do not expand the range to include the blank rows underneath your list of exclusion items. Select Query Delete. The unwanted items will be removed from the database. Save the revised version under a new file name. The original database still exists under the original name. If you need both the original database and the purged version on the same worksheet, copy the entire database and conduct the delete operation on the copy, using a newly created second copy of the database's setting sheet—in a *Symphony* SHEET window select Query Settings Name Create.

The following people submitted some version of this solution: Ronald T. Becktel of Laurel Springs, New Jersey; Carol Bruce of Columbia, Maryland; David Bryant of Portland, Maine; Floyd H. Chappel of Shickshinny, Pennsylvania; Rick Cook of Lexington, Michigan; Richard Cranford of Cambridge, Massachusetts; L. M. Crumrine of San Mateo, California; Steve Des Palmes of Boulder, Colorado; Susanne M. Edington of Lorain, Ohio; Jean-Claude Godlewski of New York City; David Goldstein of Lewisville, Texas; Thomas Jarrell of Mount Airy, North Carolina; Robert T. Lee of Harrisonburg, Virginia; Richard Lesure of Brattleboro, Vermont; Jason Marks of Portland, Oregon; J. Reid McTaggart of Houston, Texas; Cindy Menz of Columbia, Maryland; Michael Miller of North East, Pennsylvania; Brian A. Murphy of New Haven, Connecticut; Janice Murphy of Princeton, Illinois; Usha Ramawamy of Saratoga, California; Edward A. Schneider of Manistee, Michigan; Carol Spratt of Millville, New Jersey; Andrew E. Strakele Jr. of Yuma, Arizona; Paul von Fange of St. Paul, Minnesota; Karen Washburn of Manchester, Missouri; and Robert Yeater of Moundsville, West Virginia.

If you submitted a winning entry and received a flight bag but are not listed here, your letter may have arrived at our office after the editorial deadline for this issue.

Since this contest proved so popular, we're running another one. See the first item in this month's Q & A section.

ENVELOPE SOLUTION

As a busy free-lance writer, my need to produce envelopes is right up there with my requirements for food and shelter. My original solution to The Great Envelope Fiasco described in the "Ideas and Trends" section of your May issue was to use a BASIC routine to print labels. But they looked tacky. My current, almost elegant solution is to use a windowed envelope. Taped to my computer is the spacing needed from the top of a letter to make the inside address appear in the window of the envelope. As a bonus, I can tape a windowed envelope to the outside of a larger package.

David Draper
Brandon, Florida

INTERNAL TABLE OF CONTENTS

In my worksheets, I include a number of associated but separate computations. First I assign a range name to each worksheet work area. Then, starting in cell A1, I place a list of the range names and the cell addresses of the upper-left and lower-right corners of the ranges. I always press Home before saving the worksheet to insure that my internal table of contents is the first thing visible when the file is retrieved. This practice not only provides a quick reminder of the worksheet's contents but also allows me to use the GOTO key and avoid the annoyance of having to tab or use Page Down to find desired work areas.

Brian Brenegan
Milwaukee, Wisconsin

ROUNDING UP

The @ROUND function rounds fractional numbers either up or down, depending on whether the fraction is smaller than one-half or larger than or equal to one-half. The @INT function always rounds fractions down to the next whole number. But what if you always need to round fractions up to the next whole number, as in cost estimates or staffing plans? Try this:

@IF(cell>@INT(cell),
  @INT(cell)+1,cell)

If the value of the referenced cell is greater than its integer value, the formula adds one to the integer value; otherwise, the value is left as is.

Bill Leong
Hercules, California

MOVING FORMULAS BETWEEN WORKSHEETS

I started with two large worksheets that contained identical formulas and structures but that I used for two separate tasks. Over time the sheets evolved and diverged. On one of the worksheets I developed a particularly useful but complex task, located in cells S34..W54. But when I tried to transfer these source cells to the other worksheet, I discovered that these cell addresses were already occupied by another complex series of formulas that I could not move. Consequently, I needed to bring the source cells into the target worksheet into a location different from the one they had occupied in the original worksheet. But relocating them by selecting File Xtract Formulas, then File Combine Copy Entire File would not work because the Xtract/Combine process treats cell references as if they were relative, even if they are actually absolute. This would make the formula references of the source cells end up pointing to the wrong data.

I could retype everything, but then I discovered that I could use a "dummy" worksheet as an intermediate aid. First, in the target worksheet, I note the top-left cell of the area into which I wish to move the source range. Next I retrieve the source worksheet, select File Extract Formulas, point to the source range, and place it into DUMFILE1. In a new worksheet, I place the pointer in the same top-left cell as the range's original location, and select File Combine Copy Entire-File Formulas DUMFILE1. In this file, I use the Move command to relocate the code to the desired target cell. The Move command preserves the original cell references of the formulas. The formulas are now in the desired location, referring to the proper cells. Some of the formulas will display ERR. I give the source cells a range name, such as *temp*, then save the worksheet. Finally, I retrieve the target worksheet, place the pointer in the top-left cell of the target area, select File Combine Copy Named-Range (Named-Area in *Symphony*), and enter *temp*.

Ed Fine
Stoughton, Massachusetts

Another method is to point to the source formula cells, press EDIT, then Home, type a label prefix, and enter the label into the source cell. Give the cell a range name and save the file. Retrieve the second worksheet and use Combine Copy to bring the source range into the desired new location. Edit out the label prefix to return it to a formula that still refers to the desired cells.

CUMULATIVE SUM FORMULA

If you have a column of numbers representing individual data items that change over time and would like to calculate a running cumulative sum along a time axis, try a partial absolute address in your formula. In the example below, you enter @SUM in cell B3 and point to the range as usual, then make the addresses absolute by pressing the ABS key. Type the close parenthesis to finish the formula, then press EDIT and delete the dollar sign before the last row number. Now enter the formula and copy it down the column. This arrangement lets the row number in the second argument of the @SUM function adjust as it moves down while leaving the first argument tied to the top of the column. In the example below, the formula was entered into cell C2 and then copied into C3..C4.

Arthur L. Rinner
Ford Aerospace and Communications Corporation
Lompoc, California

	A	B	C	
1	Month	Cost	Cum. Cost	
2	Jan	55	55	@SUM($B$2..$B2)
3	Feb	64	119	@SUM($B$2..$B3)
4	Mar	72	191	@SUM($B$2..$B4)

TRANSPOSING ROWS AND COLUMNS

When I want to transpose a table of numbers laid out rowwise into a columnwise layout, I extract the range into a separate file, translate the file into data interchange format (DIF) with the Translate utility, then translate it back to WKS format using the columnwise option. When I combine the file into its original location, I have what I want.

Harriet C. Barry
Wayne, Pennsylvania

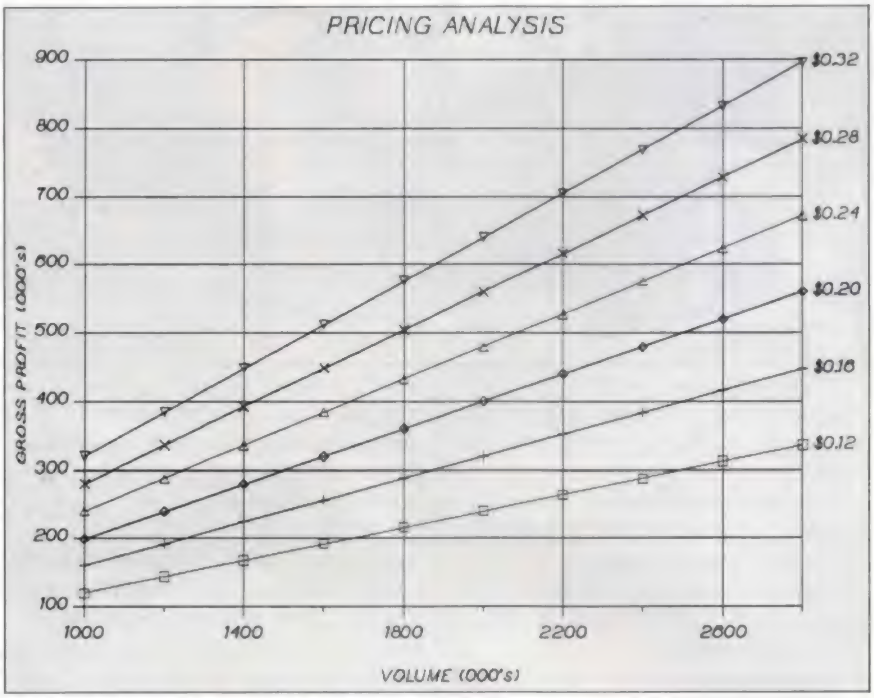
RELOCATING PRINTED GRAPH LEGENDS

I find it difficult to connect the legends that appear at the bottom of a graph with the appropriate data range in a six-range line graph. The graph is easier to interpret if the explanatory text appears on the right side of the graph, next to the appropriate data line.

To accomplish this, cancel existing legends and select the Data-Label option. Point to a Data-Label range, either a row or column, that contains as many cells as you have data items in your data range. But leave all the cells blank except the last cell, which should contain the characters you wish to appear on the right side of the graph. Select Right from the final menu in the series to position the data label to the right of the associated data value. The last value in the line is located on the right edge of the graph, so the data label will be printed just to the right of the graph.

Although there may not be enough room on your screen to display the new labels, they will appear in the printed version of the graph.

David Wolf
Toledo, Ohio



Data labels appear to the right of the final value in each range.

DON'T FORMAT EMPTY CELLS

If you've ever found the MEM indicator blinking before you've entered very much data, you should press End then Home to go to the bottom-right corner of the worksheet's active area. The active area is the rectangle in which the upper-left corner is cell A1 and the lower-right corner is defined by the lowest row and rightmost column in which any activity occurred during the current session. The activities that extend the active area include formatting, protecting, and entering contents into a cell. The size of your worksheet's active area determines how much RAM Release 1A of *1-2-3* and Release 1 of *Symphony* use. Therefore, formatting large areas of the worksheet will use up memory even if you haven't yet entered much data.

To reduce the size of your active area, structure your worksheet in a compact rectangle as close as possible to cell A1. While creating a worksheet, you should occasionally press End-Home. If you find blank rows or columns between the last visible data and the bottom-right corner of the active area, try to discover the cause. Merely deleting the empty rows or columns, however, will not recover the allocated memory. You must also save and then retrieve the file. If this doesn't work, select File Xtract to pull the part of the worksheet you wish to save into a separate file and then retrieve the file.

SYMPHONY

ENHANCED REPORT RANGES

When you generate a database, *Symphony* automatically creates an Above Report range and a Main Report range, each of which is one row deep. On the spreadsheet, the Above Report range is located just above the Main Report range. The Above Report range, containing the database's field names, is printed once at the beginning of a database printout. Therefore, it is often convenient to enhance it. For example, you can make it more descriptive of the fields in the database or insert a row of dashes between the Above Report and Main Report ranges. To do this, switch to a SHEET window, place the pointer on the Above Report range, select Menu Insert Rows, then expand the pointer to cover the number of rows of additional material you wish to include in the Above Report range. Then use the Query Settings command to expand the Above Report range's definition to include the new rows.

If the database printout fills more than one page, you can print the Above Report range at the top of each page, rather than only at the top of the first page. This is done by using the Top-Labels option instead of the Above Report range. Select SERVICES Print Settings Other Top-Labels, and designate the rows of the Above Report range as the Top-Labels. Remember to cancel the Above Report range in the Database settings sheet to avoid having those lines printed twice on the first page—once as the Top-Labels and again as the Above Report range. In the SHEET window you can access the Database settings sheet by selecting MENU Query Settings.

Mark S. Dershowitz
Katy, Texas

To connect a database to the Print command, select SERVICES *Print Settings Source Database, enter the name of your database, then select Quit Align Go. The Above Report range is printed once, followed by each record of the database.*

Do you have a favorite technique, trick, or way of using 1-2-3 *or* Symphony*? Share it! Even if it's something you consider obvious, your idea might be helpful to someone else. We'll send you $25 if we print your good idea. Send your letters to: Good Ideas Editor,* LOTUS *Magazine, P.O. Box 9123, Cambridge, MA 02139–9123.*

REVIEW: dB III IMPORT

Bridge the gap between *dBase III* and *Symphony* with this translation program.

BY WILLIAM G. BARKER

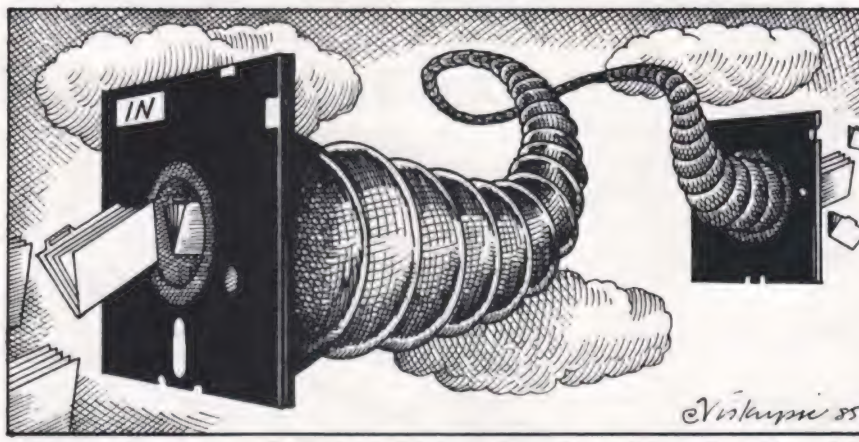
A manager in a large company keeps employee records on *dBase II* files. When she needs to explore options in salary increases or retirement policies, she transfers the employee information to a *1-2-3* worksheet. Within the worksheet, the manager can easily address what-if questions and plot the results. In this way, she combines the best features of *dBase II* and *1-2-3*.

Release 1A of *1-2-3* made this scenario possible by providing a utility program to convert a *dBase II* data file (DBF) into a *1-2-3* worksheet file (WKS). The Lotus Translate utility maintains *dBase II*'s field types and cell contents.

When *Symphony* and *dBase III* arrived, things began to get difficult. *Symphony* could transform a *1-2-3* worksheet file to a *Symphony* worksheet (WRK), and *dConvert* (part of the *dBase III* package) could convert a *dBase II* data file to a *dBase III* data file. There seemed to be no way, however, to translate a *dBase III* file into a *Symphony* or *1-2-3* worksheet file. To the rescue comes *dB III Import* by Syscomp.

The only thing *dB III Import* does is translate *dBase III* data files into *1-2-3* or *Symphony* worksheet files, and it does it well. The program is straightforward in operation and can be easily used without reading the terse, 12-page documentation.

There are two ways to run the program. The first is to specify all the command options on the DOS command line, perhaps as part of a batch file. The documentation suggests that running the program from the command line allows you to use hardware that is not totally IBM PC compatible.



To run the program from the DOS command line, you specify the names of the input files, output files, and options. There are three options:

1. /S tells *dB III Import* to create a *Symphony* file rather than a *1-2-3* file, which is the default output.
2. /G automatically generates a *Symphony* FORM window with all associated named ranges.
3. /L translates *dBase III*'s logical fields into Lotus's @TRUE and @FALSE values rather than keeping the literal values, which is the default procedure.

The file names and option choices entered on the DOS command line contain the same information you are prompted to provide when you run *dB III Import* in the menu mode, the second optional method.

Unfortunately, *dBase III* memo fields are ignored, which means you lose this valuable method of internal documentation. On the other hand, the program will optionally set up a *Symphony* FORM window with all the associated named ranges, an impressive capability that should be an asset.

This small (19K) program comes on a single, non-copy-protected floppy disk. The lack of copy protection in this case makes the program convenient to use, since it can be put on a hard disk or on a *1-2-3*, *dBase III*, or *Symphony* database file disk. In addition to the program itself, the disk contains some sample *dBase III* data files and a batch file.

dB III Import is a useful, solid program that would have a wider appeal if it did more—for example, if it also converted files to DIF or ASCII formats. The people at Syscomp obviously have talent, but they may have produced an excellent product for too small a market. It is heartening to note that they recently introduced a new product, *dB III Export*, which can create *dBase III* database files from *1-2-3* or *Symphony* worksheet files. As an option, *dB III Export* will append data in a Lotus worksheet file to an existing *dBase III* database. This allows you to create very large databases while keeping all the data entry and preliminary data analysis within the Lotus environment. ■

IN BRIEF

dB III Import, Release 1.0. Syscomp, 8825 Aero Dr., Suite 210, San Diego, CA 92123, 619-277-0400. IBM PC and compatibles, 64K RAM, DOS 2.0 or higher. Released 2/85. $75, $125 for *dB III Import* and *Export* set. Money-back guarantee, one-year warranty, not copy-protected.

William G. Barker is a consultant in the Dallas–Fort Worth area. He is currently the president of the Southwest PC Users Group.

GARY VISKUPIC

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CIRCLE 136 ON READER SERVICE CARD

REVIEW: FINANCIAL FASTRAX

Thirty-two models for cash-planning needs—from education to business investment to personal retirement

BY GEORGE W. GERSHEFSKI

How much can you borrow on a 15-year loan at 13.5 percent interest with a $30,000 balloon payment due at closure and monthly payments of $1,000? If you need to solve this type of calculation, *Financial Fastrax* may be for you. *Fastrax* is a three-disk collection of 32 templates for *1-2-3* that help solve a variety of personal and business financial-planning problems. The worksheets provide a sophisticated analysis that takes into account the time value of money and tax considerations.

Volume 1, Disk A of *Fastrax* contains financial utilities that calculate compound interest, internal and financial management rates of return, loan analysis, several types of depreciation, currency conversions, and calendars. Volume 1, Disk B deals with the effects that the 1984 Tax Reform Act has on depreciation and the investment tax credit for various types of assets.

The templates in Volume 2 are for personal financial planning. They include a personal balance sheet, income statement, cash-flow and annual budget analysis, educational financial-needs projection, rent-versus-buy comparison, retirement-income projection, as well as analyses of stocks, bonds, Treasury bills, and precious metals. Both volumes contain 100 prepared graphs that illustrate the data you generate with the templates.

The education cost planner in Volume 2 demonstrates the worksheet's complexity. Inputs consist of college cost per year in current dollars, number of years until college, estimated annual inflation rate, discount rate for additional funding requirements, present account value, annual contribution, growth rate, and the tax rate for four types of investments: yearly taxable growth, tax-deferred growth, tax-free growth, and capital gains.

Based on this input, the model calculates the projected yearly costs and discounts these to estimate the amount needed for the first year of college. The worksheet then determines the funds that are available based on the specified portfolio of investments. Finally, the model discounts the projected shortage or surplus funds to today's dollars and calculates the additional yearly savings required to fund the shortage.

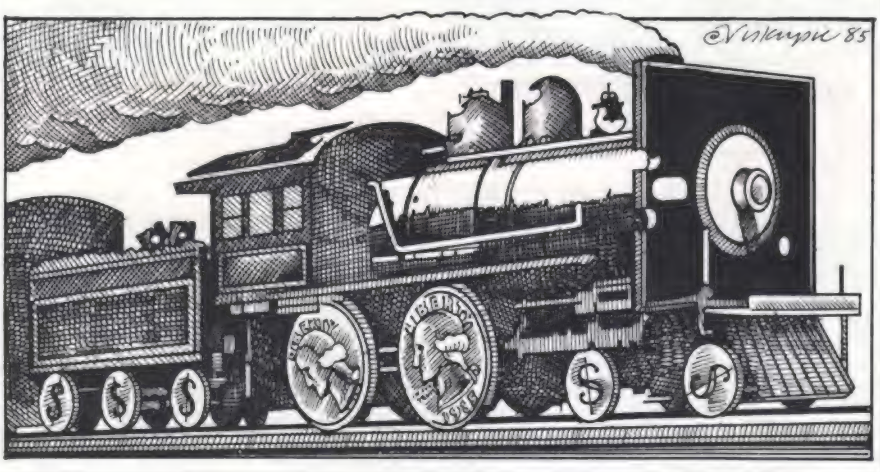
Fastrax is easy to use. You retrieve the desired worksheet, then press Alt-M, and you are ready to go. A macro menu lets you input data, save the file, print a report, draw a graph, create a new file, or quit. In general, terms are precisely defined so that the business meaning of the inputs and outputs is clear. In a few instances, however, it is necessary to examine the equations to determine the exact meaning.

The worksheets contain clever applications of some *1-2-3* capabilities. Particularly noteworthy are the techniques used to develop a calendar, the layout of the worksheets that display user-oriented screens and allow multiple scenario exploration, and the use of menu macros. Unfortunately, the balance sheet, income statement, funds flow, and annual budget worksheets are not fully integrated. Information does not automatically flow between the income statement and the balance sheet, and the difference between two balance sheets cannot be used to develop the funds flow.

The financial calculation utility worksheets are very flexible. For example, when performing a loan analysis, you can solve for either the original principal, the monthly payment, the number of monthly payments, the interest paid between two dates, or the remaining balance at any date.

On the other hand, the personal planning and analysis worksheets in Volume 2 tie you to the assumptions and types of analyses used by *Fastrax*'s developers. For example, the worksheets for determining the assets required to fund a desired level of retirement income are built around the assumption that capital is not depleted during the retirement period. Therefore, this product cannot help you determine the effect of using a yearly portion of the capital. You would have to develop your own worksheet to depict the changing year-by-year

George W. Gershefski, a business consultant in Cherry Hill, New Jersey, is the author of Using Lotus 1-2-3 to Solve Your Business Problems, *from Rowman and Allanheld.*



GARY VISKUPIC

investment base.

Each worksheet is documented with a brief description of the principles involved, the file name, the input items required, sample problems, an output report, and in some instances, a copy of the graphs produced. The documentation neither contains a detailed explanation of the calculations nor defines the equations used. This is a major weakness if you think you will want to double-check or modify the models to make sure they meet the specific requirements of your application.

The User Manual does provide some background information about the use of *1-2-3*. However, this will not be sufficient for a person who is unfamiliar with the program. Since the calculations used in *Fastrax* are not fully documented, checking their relevance and accuracy for your application requires printing a cell-by-cell listing. Not only must you know how to print using the Option Other Cell-Formula Unformatted command, you also need to understand the grammar of Lotus's formulas, logic structures, and @functions. This would be educational, but very hard going for a beginner. Even experts would find it time-consuming.

In addition, if you are unfamiliar with financial terminology, you will need to supplement the User Manual with additional reference materials. Although chapter 3 of the User Manual discusses the fundamentals of personal financial planning, the scant 15 pages cannot adequately cover this complex subject.

Financial Fastrax will be best utilized by a sophisticated financial analyst who has a good working knowledge of *1-2-3* and who frequently needs to perform many of these preprogrammed calculations. This multipurpose set of worksheets should, however, be carefully evaluated against packages specifically designed for particular applications, such as real-estate evaluation or pension planning. ■

IN BRIEF

Financial Fastrax. Integrated Equity Planning, 98-211 Pali Momi St., Suite 302, Aiea, HI 96701, 808-488-4766. 192K of RAM. 132-column printer. Verson 2.2 released 2/85. Volume 1 (Disks A and B), $60; Volume 2, $60. Disks warranteed free from defects in material and workmanship under normal use for 90 days if license agreement is returned within 10 days of purchase.

REVIEW: CASHFLOW

This farm-management tool helps you impress your banker and harvest higher profits.

BY DICK LANDIS

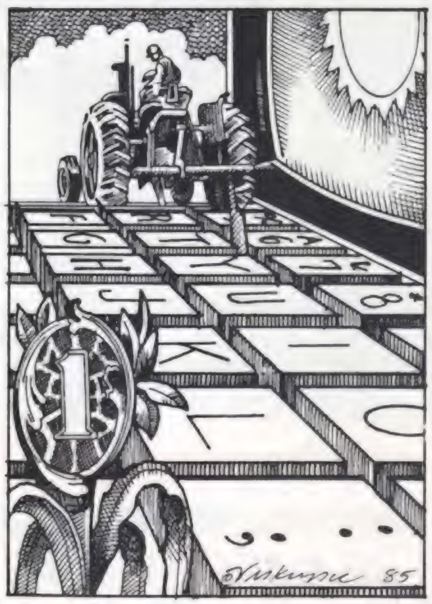
The shakeout in agriculture means losses not only to farmers and growers but also to banks and businesses in farming communities. Many of the survivors are drastically cutting back. In response, some farmers and agricultural lenders are developing better financial-management tools.

Galen Buller farms 1,000 acres of corn and soybeans in Ingalls, Kansas, and also develops farm-application software templates for *1-2-3* and *Symphony* on his IBM PC and Tandy 1200 computers. Buller's *Cashflow* template, which is marketed by FBS Systems of Aledo, Illinois, tracks income and expenses, generates crop budgets, and can compute a 12-month cash-flow projection for any cash crop or livestock operation. It figures profit or loss on land you are considering buying and is handy to take to the bank to demonstrate, with color graphics, what happens to the bottom line as you change crops and livestock to adjust for fluctuating market prices.

Since a cash-flow model is only as accurate as the information you put into it, Buller designed *Cashflow* to be used in conjunction with *TransAction Plus,* an accounting program also from FBS Systems. Data are entered into the accounting package once a month when you write your checks. Once the checks are written, you dump this information into *Cashflow* for historical comparisons and future projections that can be based on annual figures, timed income, expenses, and inventories.

In addition to an overall farm cashflow model, the template comes with a tutorial disk and five other models: Crop Budget; Feedlot; Cash Grain; Money, a loan amortization model; and Balance Sheet. You can conduct what-if experiments by changing crops and watching the effects on your outstanding loan balances.

Dick Landis is the coauthor of Spreadsheet Software for Farm Business Management, *published by Reston Publishing Company.*



The package can handle as many as four different farm ownership or rental arrangements and can compute nine crop projections. The Crop Budget model generates five pages of information that contain 20 charts and profit-and-loss projections for crop expenses, including break-even prices and yields. The Feedlot model accommodates pricing for wet and dry corn and grain. It includes four different mixtures of feed, and it tracks the amount of time the cattle have been on each mixture. It carries costs forward, giving a total price of the feed, including conversion and cost of grain.

The Money model lets you enter the amount, terms, payments, and interest rates of outstanding loans. It gives you a year-by-year analysis of the total payments and does a comparative analysis of what you could make by investing the same loan amount in other ways.

The true value of *Cashflow* is revealed when the farmer meets with a lender to review a loan application. Gary Moore, marketing officer for the Montezuma Credit Union in Montezuma, Kansas, has been using the program for several years. "Two years ago we kept track of one farm's projected figures for the year, and we were off by only $500 on a several thousand dollar budget," he says. After that experience, the bank began recommending the program to its farm customers.

The current version of *Cashflow* has help screens and a menu-driven entry process. You can run the entire model and generate all reports without entering a single *1-2-3* command. The most recent version has some particularly helpful financial-analysis features that track principal and interest separately on loan payments and that incorporate a balance sheet and income statement. Perhaps the most exciting feature of the new version is the Ratio Report, which automatically breaks down all the information from the balance sheet and income statement into financial ratios. The numbers on the printout of this report often supply enough information to satisfy most agricultural lenders.

One problem with *Cashflow* is its huge appetite for computer memory. Unfortunately, the package wasn't designed in macro-driven modules that could be combined and extracted as needed. Hopefully, the model will save you enough to cover the cost of the extra memory. ■

IN BRIEF

Cashflow. FBS Systems, P.O. Drawer 248, Aledo, IL 61231, 309-582-5628. 320K of RAM for *1-2-3*, 512K for *Symphony* on IBM PC. Version 3.1 released 6/85. $198, $15 for demonstration disk.

GARY VISKUPIC

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LISTINGS: LOTUS-COMPATIBLE SOFTWARE

Unless otherwise noted, all software in this section works with 1-2-3 *Release 1A and* Symphony *Release 1.0 under MS-DOS 2.0 or higher on an IBM PC or other Lotus-compatible computer. Prices do not include sales tax, postage, or handling charges.*

Information in these listings is supplied by product vendors. LOTUS *is not responsible for either the accuracy of the information or the quality of the product.*

ACCELERATORS

Accelerator:PC
SWFTE, P.O. Box 219, Rockland, DE 19732, 302-658-1123. Increases cursor speed through acceleration (the rate at which keystrokes are processed and displayed) and responsiveness (the touch of the keyboard). Both can be adjusted from normal (zero) to maximum (nine), and acceleration can be shifted without leaving other programs. Utility requires 192K of RAM for *1-2-3*, 320K for *Symphony*. Released 5/85. $99.95.

Recalc+
GNP Development Corporation, 1244 East Colorado Blvd., Pasadena, CA 91106, 818-577-2550. Works with *1-2-3* and *Symphony* in RAM, using the Intel 8087 chip to increase calculation speed as much as 3,000 percent. Utility requires 192K of RAM for *1-2-3*, 320K for *Symphony*; and the Intel 8087 chip on the IBM PC, 80287 chip on the IBM PC AT, or 8087-2 chip on the Compaq Deskpro. Released 4/85. $95 for *1-2-3* version; $149 for *Symphony* version.

AGRICULTURE

Cashflow, Version 3.1
FBS Systems, P.O. Drawer 248, Aledo, IL 61231, 309-582-5628. Menu-driven farm application models include Cashflow, Crop Budgets, Feedlot, Cash Grain, Money (an amortization model), and a general accounting application. The models track income and expenses, and generate reports and graphs for crop budgets, 12-month cash-flow projections, and comparative loan analyses. The package handles up to four farm ownership or rental arrangements and up to nine crops. Includes tutorial disk and help screens. Template for *1-2-3* requires 320K of RAM. *Symphony* version being developed. Released 6/85. $79.95. *(Reviewed in this issue.)*

Farm Management Series
Harris Technical Systems, 624 Peach St., Lincoln, NE 68501, 402-476-2811. Seven templates applicable to the following: Business Management, Cow-Calf Herd Management, Feedlot Cattle Management, Swine Farrowing, Swine Finishing, Crop Management, and Farm Machinery Management. Templates for *1-2-3* require at least 128K of RAM each. Released 1/85. $95 each.

BUDGETING & PLANNING

Bottomline-V
Ilar Systems, 1300 Dove St., Suite 105, Newport Beach, CA 92660, 714-476-2842. Provides corporate financial decision support with four financial models: historical, 12-month, quarterly, and five-year. Includes manual. Tutorial audiocassette available for $15. Template requires 192K of RAM for *1-2-3*, 320K for *Symphony*. Released 3/85. $295.

Cash-Flow Forecaster
RoMec, 1000 Tech Park Dr., Billerica, MA 01821, 617-667-8944. Provides one-year forecasts (by month) for sales, cost of goods sold, operating expenses, and net income. Prints income statements, balance sheets, and cash-flow forecast reports in graphic or numeric form. Template for *1-2-3* requires 256K of RAM. Released 3/85. $79.

Fastplan Financial Planner
Arthur Young Business Systems, 1111 Summer St., Stamford, CT 06905, 203-356-9104. Financial model produces five-year annual and quarterly projections of cash flow, income, manufactured inventory, balance sheets, and key ratios. Color-graphic review of borrowing levels and limits, cash flow, and valuation. Template for *1-2-3* requires 192K of RAM. Released 3/85. $495.

Financial Fastrax, Version 2.2, Volume I
Integrated Equity Planning, 98-211 Pali Momi St., Suite 302, Aiea, HI 96701, 808-488-4766. Personal financial planning and analysis program calculates compound interest, internal rate of return, amortization, depreciation, currency conversion and calendar math calculations; and performs refinancing, loan, and depreciation-method analyses. Updated for 1984 Tax Reform Act. Templates for *1-2-3* require 192K of RAM. *Symphony* version to follow. Released 2/85. $60. *(Reviewed in this issue.)*

THIS MONTH:

COMING UP:

Accounting & Bookkeeping
File-Format Translation
Financial Analysis
Manufacturing
Marketing & Sales
Real Estate
Scientific & Engineering

Financial Fastrax, Version 2.2, Volume II
Integrated Equity Planning, 98-211 Pali Momi St., Suite 302, Aiea, HI 96701, 808-488-4766. Personal financial planning and analysis program maintains financial statements, cash-flow planner, budgets (planned versus actual with variances), and investment records (investment calculations updated for 1984 Tax Reform Act); performs accumulation planning and calendar math. Template for *1-2-3* requires 192K of RAM (*Symphony* version to follow). Released 2/85. $60. *(Reviewed in this issue.)*

Financial Planning System
Partners Consulting, 1340 West Mulberry, Phoenix, AZ 85013, 602-274-2461. Three financial plan preparation packages for professionals. *Finplan* schedules include income statement, balance sheet, cash flow, budget worksheet, asset diversification, retirement and capital needs analysis, income tax analysis, estate tax and tax shelter planning, and financial plan summary. Forms are modifiable. A second package, *Invsumm*, integrates with *Finplan* to maintain a database for tracking clients' investments. The third, *Financial Toolkit*, adds the functions of break-even analysis, amortization, depreciation, key ratios, internal rate of return, investment analysis with projected yield, net cost comparisons of life insurance policies, short estate tax calculation, personal expense analysis, and business valuation. Templates for *Symphony*. Each package requires 512K of RAM. Hard disk and compressed print capability recommended. Released 4/85. *Finplan*, $840; *Invsumm*, $440; *Financial Toolkit*, $350.

+Forecast
Computer Software Consultants, 180 State St., Binghamton, NY 13901, 607-722-3538. Decomposition method using regression and weighted averages provides five-year projections, including expected trends, seasonal variations, and average error estimate. Numeric and graphic output. Template requires 256K of RAM for *1-2-3*, 512K for *Symphony*. Graphics monitor, board, and printer recommended. Released 2/85. $149.90.

Hotel Budget and Performance Analyst
Acom Computer Systems, 160 Gince, Ville St. Laurent, Quebec, Canada, 514-335-0620. Produces detailed hotel budgets and daily labor forecasts. Uses variable budgeting techniques for analysis. User-modifiable and can be used with Talk S/3X, a link to the IBM S/3X. *Symphony* template requires 512K of RAM. Released 7/84. $500 to $2,000.

OptionWare Organization and Budget Series
OptionWare, 4 Barnard Lane, Bloomfield, CT 06002, 800-334-2355. Template series for *1-2-3* includes: Department Budgets, Department Budgets History, Breakdown of SG&A Expenses, History of SG&A Expenses, Consolidated Manpower & Expenses, Consolidated Manpower & Expenses History, Projected SG&A Expenses, Department Budget Projections. Requires 320K of RAM. Released 5/84. $99.95 per template, or selected groups of five in Multi-Paks for $395.

Project Reporter
Cinnamon MicroSystems, P.O. Box 29494, Minneapolis, MN 55429, 612-574-1697. Three reports and 13 graphs for monthly reporting of project status and financial information. Actual versus plan and forecast for up to 11 departments charging to a project. Template for *1-2-3* requires 256K of RAM. Released 4/84. $79.95.

Simplex PC II
Morgan Computing, P.O. Box 112730, Carrollton, TX 75011, 214-245-4763. Linear programming model solves allocation-of-resources problems with up to 99 variables and 99 constraints. Template for *1-2-3* requires 192K of RAM. Released 6/84. $100.

Time Line
Breakthrough Software, 505 San Marin Dr., Novato, CA 94947, 415-898-1919. Project management program writes spreadsheet files; performs resource leveling, lead/lag scheduling, resource costing, ASAP, fixed date, ALAP, and span timing. Allows unlimited tasks and dependencies, and selective reporting. Worksheet-compatible program requires 384K of RAM for *1-2-3*, 512K for *Symphony*. Released 10/84. $395.

DOS

DoubleDOS
SoftLogic Solutions, 530 Chestnut St., Manchester, NH 03101, 800-272-9900. Allows concurrent processing of two programs in full-screen windows that can be viewed alternately. Background program requires 320K of RAM for *1-2-3*, 640K for *Symphony*. Released 3/84. $99.

DPath, Version 2.1
Personal Business Solutions, P.O. Box 757, Frederick, MD 21701, 301-865-3376. Locates and makes available data files located in directories other than the current directory. Finds SET, HLP, CNF, DRV, and other files. Background program requires 192K of RAM for *1-2-3*, 320K for *Symphony*. Released 1/85. $25.

EasyPath
Polygon Software, 363 Seventh Ave., New York, NY 10001, 212-563-5487. Provides immediate access to program and data files in any subdirectory or on any drive. Includes RAM disk support. Background program requires 4K of RAM. Released 10/84. $103.50.

The Extender
Uniform Software Systems, 225 Santa Monica Blvd., Suite 514, Santa Monica, CA 90401, 213-395-9674. Allows *1-2-3* to

run in a "protected virtual address mode," increasing the current maximum usable spreadsheet memory, which is about 500 bytes, to more than 920 bytes. Utility requires IBM PC AT or compatible machine using the 80286 chip. *Symphony* version being developed. Released 7/85. $99.

MACROS

AutoMac
DataSource Publishing, 7450 Washington Ave. S, Eden Prairie, MN 55344, 612-944-5113. Provides a learn mode for creating macro commands. Saves, stores, and helps name keystroke macros. Utility for *1-2-3* requires 192K of RAM. Released 2/85. $49.95.

Keymac
Fox and Geller, 604 Market St., Elmwood Park, NJ 07407, 201-794-8883. Provides a learn mode for capturing keystrokes that are then converted into a *1-2-3* macro or stored in an external macro library. An "express" feature reduces macro size by about 50 percent. Background program requires 50K of RAM. Released 6/85. $49.

Macro +
GNP Development Corp., 1244 E. Colorado Blvd., Pasadena, CA 91106, 818-577-2550. Macro creation and storage utility allows up to ten macros to be assigned to the number keys and executed from the keyboard without being written to a spreadsheet. Each macro storage file holds ten 200-keystroke macros that can be transferred from memory to a worksheet for editing. Utility for *1-2-3* requires 128K of RAM. Released 4/85. $49.

Macro-Toolkit
MicroRealities, P.O. Box 60123, Grand Junction, CO 81506, 303-245-8358. Automates complex or repetitive Lotus commands; prints address labels from a database; allows menu selection of macro keywords; and reconfigures entries from row-to-column, column-to-row, or into reversed order. Template requires 192K of RAM for *1-2-3*, 320K for *Symphony*. Released 4/85. $45.

ProKey 3.0
RoseSoft, 4710 University Way NE, Seattle, WA 98105, 206-524-2350. Creates macros for storage in RAM. Background program requires 192K of RAM for *1-2-3*, 320K for *Symphony*. Released 1/84. $129.95.

Quickmac
Fox and Geller, 604 Market St., Elmwood Park, NJ 07407, 201-794-8883. Program generator turns familiar programming statements, such as IF THEN/ELSE, into complete programs using *1-2-3* macro tools. Includes screen editor, syntax checker, and *Keymac*, a macro learning facility. Background program requires 100K of RAM. Released 6/85. $99.

Spreadsheet Keyware
Polytel Computer Products, 1250 Oakmead Pkwy., Suite 310, Sunnyvale, CA 94086, 800-245-6655; in California, 408-730-1347. Stores a series of keystrokes that can be played back in any worksheet by pressing a single key. Utility for *1-2-3* requires 256K of RAM and game port adapter. Released 11/84. $79.

MEDIA

The Bottom Line
The Bottom Line Software, 52 Young Ave., Pelham, NY 10803, 914-738-1489. Integrated budget and production planning templates for television and film produce production-cost estimates and actuals (based on AICP form), production schedules (based on shooting script), shotsheets, payroll estimates, and actuals. Templates for *1-2-3* require 256K of RAM. Released 6/84. $795.

Timing Template
The Bottom Line Software, 52 Young Ave., Pelham, NY 10803, 914-738-1489. Calculates cumulative TV and film running time based on segment lengths. Template for *1-2-3* requires 256K of RAM. Released 2/85. $150.

Paper Edit Template
The Bottom Line Software, 52 Young Ave., Pelham, NY 10803, 914-738-1489. Calculates segment and cumulative length of edited TV and film pieces based on standard time code numbers. Template for *1-2-3* requires 256K of RAM. Released 2/85. $150.

SECURITY

Passkey
Fox and Geller, 604 Market St., Elmwood Park, NJ 07407, 201-794-8883. Worksheet security program allows user to assign a password to a worksheet and encrypt the worksheet to prevent access by any other software. Background program for *1-2-3* requires 3K of RAM. Released 6/85. $49.

Password +
GNP Development Corp., 1244 East Colorado Blvd., Pasadena, CA 91106, 818-577-2550. Allows user to select passwords of up to 36 alphanumeric characters for restricting access to worksheet files. Does not increase size of file. Utility requires 192K of RAM for *1-2-3*, 320K for *Symphony*. Released 4/85. $49.

WORKSHEET ANALYSIS & CONSOLIDATION

The Cambridge Spreadsheet Analyst
The Cambridge Software Collaborative, University Place, Suite 200, Cambridge, MA 02138, 617-576-5744. Scans worksheet files for 14 conditions that may indicate errors; locates circular references; allows cross-referencing of cells, ranges, or *1-2-3* functions; and permits interactive probing of the cell network affecting a given formula. Utility for *1-2-3* requires 192K of RAM; more recommended. Released 4/85. $149.

DocuCalc
Micro Decision Systems, P.O. Box 1392, Pittsburgh, PA 15230, 412-854-4070. Provides full documentation and debugging aids for worksheets, including grid layouts, circular-reference detection, and cross-reference reports. Also prints global details, including format, column width, and range names. Utility requires 192K of RAM for *1-2-3*, 320K for *Symphony*. Released 9/82. $95. (Version 5.0 *reviewed in May issue.)*

Ranges, Version 2.0
Pro Populo, 5009 Guide Meridian, Bellingham, WA 98226, 206-398-2806. Extracts range names and indices from *1-2-3* worksheets and displays, prints, or saves them in PRN files for later import into a worksheet. Utility for *1-2-3* requires 192K of RAM. Released 2/85. $49.95.

The Spreadsheet Auditor, Version 2.0
Consumers Software, 8315 Monterey St., Suite B, Gilroy, CA 95020, 800-645-5501; in California, 800-645-5501. Displays and prints formulas in spreadsheet layout; documents and traces macros; provides cross-reference and range name location reports; traps circular references; and contains a sideways print feature. Utility for *1-2-3* and *Symphony* requires 128K of RAM.

$149. Registered users of the previous version can upgrade for $50.

X-Check
Catalyst Consultants, 95 Madison Ave., CN 1989, Morristown, NJ 07960, 201-993-0940. Menu-driven utility audits, documents, and debugs spreadsheets. Generates reports that identify named ranges, spreadsheet macros, invalid cell references, unprotected formulas, and circular calculations. Requires 192K of RAM. Released 6/85. $99. Discounts available on quantity orders.

X-Y-Z
Intex Solutions, P.O. Box 183, Needham Heights, MA 02194, 617-431-1063. Menu-driven data comparison and summarization program consolidates *1-2-3* worksheets with sum, average, weighted average, maximum, minimum, count, and standard deviation. Compares and graphs worksheet data by horizontal (row) or vertical (column) slicing. Creates an audit trail in English sentences of the consolidation logic and instructions used. Requires 192K of RAM. Released 4/85. $45 for capacity of up to four worksheets; $145 for 12-worksheet version; $395 for 255-worksheet version.

ZyIndex Text Retrieval
ZyLab, 233 East Erie St., Chicago, IL 60611, 312-642-2201. Full-text indexing, storage and retrieval of ASCII files. Three versions differ primarily in capacity: Standard, Professional, and Plus (for multi-user networks). Utility for *1-2-3* requires 192K of RAM; 256K recommended. Released 1/85. Standard, $145; Professional, $245; Plus, $695.

1-2-3 Cross Reference
Flowsoft, 1215 Walnut St., Philadelphia, PA 19107, 215-923-2807. Lists all data and formula cells and locations that reference them, for defining the value of any cell. Utility for *1-2-3* requires 256K of RAM. Released 3/84. $75.

LOTUS ADD-INS

Lotus Development Corporation supplies or sells several add-in programs. These include:

DOS

When attached, adds DOS to the SERVICES menu. User is able to go to DOS and then return to *Symphony* without disturbing the current worksheet. This add-in is supplied free with *Symphony*.

SPELLING CHECKER

Checks and corrects spelling using an American or British dictionary. Allows creation, modification, and selective use of up to six auxiliary dictionaries. User can correct a misspelled word manually or choose from a list of displayed alternatives. Includes reference manual and tutorial. Released 3/85. $139. Available from Lotus dealers.

TEXT OUTLINER

Creates multilevel outlines that are fully integrated with *Symphony* documents. Users can switch from outline to DOC window and back with single keystrokes. Outline items, and the associated word-processing text, can be rearranged, copied, or deleted. Generates a table of contents. Includes reference manual and tutorial. Released 3/85. $139. Available from Lotus dealers.

RANGE INPUT

Provides a *Symphony* equivalent of the *1-2-3* Range Input command. This add-in is in the public domain and can be downloaded from the World of Lotus on CompuServe.

MACRO CONVERSION AID

Helps convert *1-2-3* macros to *Symphony* Command Language. While the add-in converts macros, it does not optimize their operation. For optimal performance, you must re-create macros. This add-in is in the public domain and can be downloaded from the World of Lotus on CompuServe. ■

TYPES OF SOFTWARE LISTED HERE

Templates are regular worksheet files (with a WKS or WRK file name extension) that are retrieved into *1-2-3* and *Symphony*. Templates can be simple models or complex, menu-driven, and macro-controlled multifile systems.

Add-Ins are programs that attach themselves to *Symphony*. They are accessed through new menu choices appended to the regular *Symphony* menu system. Add-in programs provide additional functions, such as performing a spelling check or handling the transfer of data between *Symphony* and another program or computer, such as a corporate mainframe.

Utility programs provide information about or enhancements to worksheet files. For example, a utility might give a map of spreadsheet formula dependency patterns. Utilities are independent programs that are neither retrieved into nor appended to Lotus products.

Translators are stand-alone programs that convert worksheet files into formats readable by other programs or computers. They also allow importation or retrieval of certain non-worksheet files into Lotus products. Unlike add-ins, translators remain separate from *1-2-3* or *Symphony*.

Worksheet-compatible programs are stand-alone products that can read or write Lotus worksheet files. These programs usually provide functions not available in the Lotus product. For example, a worksheet-compatible program might provide extended statistical analysis capabilities.

ASCII-compatible programs are stand-alone products that can read and write ASCII text files, also called PRN, or print, files. These programs usually provide functions not available in the Lotus product. For example, an ASCII-compatible program might perform advanced statistical analysis on spreadsheet figures.

Other types of software are stand-alone products that provide some additional functionality to users of Lotus products.

WRITE US!

Have you used any of these products or any other Lotus-compatible product not listed here? Did it perform as promised? What are its strong and weak points? Considering the use you get from it, was it worth the purchase price? We'll send you $25 if we publish your comments in our upcoming "Reader Review" section. Send your letters to: Resources Editor, LOTUS *Magazine, P.O. Box 9123, Cambridge, MA 02139-9123.*

A FRESH NEW APPROACH FOR PINPOINTING SPREADSHEET PROBLEMS

WHAT DOES THE ANALYST DO?

AUTOMATIC SCAN provides a comprehensive diagnosis of your entire worksheet, pinpointing unusual situations that may indicate errors. It then permits you to explore these problem areas in detail.

CIRCULAR REFERENCE LOCATOR identifies formulas that are caught in one or more endless loops. It provides a graphic display of all the participating formulas in each loop.

CROSS REFERENCE shows where and how a chosen cell, specified range, named range, or Lotus function is used in formulas throughout the worksheet. For a cell or range you can request that the search be explicit (identifying only exact matches) or all-inclusive.

INTERACTIVE PROBE helps you explore the logic of your worksheet. It allows you to trace the formulas and intermediate values which flow into a chosen cell.

Available for 1-2-3 and Symphony running on IBM-PC, IBM-XT, IBM-AT, or compatible with PCDOS 2.0 or higher.

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WHY IS THE ANALYST UNIQUE?

The Cambridge Spreadsheet Analyst indeed helps you isolate problems, understand model structure, and document 1-2-3 or Symphony worksheets. But what really makes it special is how it does it.

"(The Cambridge Spreadsheet Analyst) is a unique package. There is simply nothing like it for the 1-2-3 programmer. If you're designing, running or debugging 1-2-3 spreadsheets, this package is a must. If you're running your business on questionable 1-2-3 worksheets, it's a lifesaver."

—PC WEEK 4/23/85—

The Analyst is an interactive tool. You are always in command, exploring at will the various facets of your worksheet.

The Analyst is an intelligent tool. It acts as your guide, seeking out problem areas.

the CAMBRIDGE SPREADSHEET analyst

HOW DOES THE ANALYST WORK?

The Analyst is a FAST, FREE-STANDING program. It is written in 'C' and Assembler for speed and works directly on Lotus files.

The Analyst's LOTUS-LIKE COMMANDS eliminate the need for training.

The Analyst's special LOTUS EMULATION MODE allows you to view the worksheet in familiar format.

Use of the FUNCTION KEYS makes the Analyst truly interactive. You can browse through the worksheet in Lotus emulation mode to focus on a chosen cell, then press the XREF key to find where that cell is used or press the PROBE key to trace its origins. Similarly when in SCAN, XREF or PROBE, you can press the SHEET key to view the worksheet context of a cell in question.

The Analyst's PRINT feature lets you conveniently DOCUMENT your session as you go along. Context-sensitive reports can be requested at virtually any time with the press of a single key.

Finally, to aid the occasional user, a context-sensitive HELP facility is available with the push of a button.

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CIRCLE 139 ON READER SERVICE CARD

MAKING IT WORK

Helpful hints on keeping hardware and software on speaking terms

PRINTGRAPH

COLOR BAR GRAPHS WITH CROSS-HATCHING

Symphony's Graph settings sheets do not allow bar graphs to display both cross-hatching and color on your screen, but you can combine these attributes in the printed versions of your graphs. In *Symphony*, while defining a graph in a SHEET or GRAPH window, specify a monochrome graph by selecting MENU Graph 2nd-Settings Other Color No. Select Switch to change to the 1st-Settings menu. Select Hue and then, one by one, select the letter for each range and the number between 1 and 7 that represents the cross-hatching that you want for the corresponding bar. The *Symphony* manual details this process. Then select Image-Save to extract a copy of the graph from the worksheet and save it in a separate picture (PIC) file. After retrieving PrintGraph and marking the graph for printing, specify the desired color for each bar as the Hue for the number corresponding to the cross-hatching number that you selected for that bar in *Symphony*. When the graph is plotted, each bar will be drawn with both the cross-hatching and the selected color.

For example, if three ranges are plotted on a bar graph, select 2 as the hatching pattern for the A range, 3 for B, and 6 for C. In PrintGraph, specify red for hue 2, blue for hue 3, and green for hue 6. Assuming that you selected black for hue 1, a four-color chart will be drawn. The titles and axes are in black, and the A, B, and C bars are in red, blue, and green, respectively, each with a different cross-hatching.

Tim Lawrence
Randallstown, Maryland

You can get the same effect in 1-2-3. *When defining the graph, select /Graph Options B&W to create a black-and-white graph with cross-hatching. Save the graph with the /Graph Save command. In PrintGraph, select the appropriate device driver, and if you are using a color printer or plotter, select Options Color to choose a color for each range. For example, if you are plotting three ranges on a bar graph, you can specify red for the A range, blue for the B range, and green for the C range. Assuming that you selected black for the grid, you will produce a four-color chart. The titles and axes will be black, and the data ranges, each with a different cross-hatching, will appear in color.*

This can greatly increase the dramatic effect of graphs intended as part of a formal presentation.

PRINTGRAPH THE SAME FOR 1-2-3 AND SYMPHONY

People who use both *1-2-3* and *Symphony* may not know that both programs use similar versions of PrintGraph, even though *1-2-3* calls the file GRAPH.EXE and *Symphony* calls it PGRAPH.EXE. This means that you may use *Symphony*'s PrintGraph to draw graphs saved with either *1-2-3* or *Symphony*. This is a bonus for hard-disk users who can conserve space by placing only one version of PrintGraph on their hard disk.

Dan Domzalski
Buffalo Grove, Illinois

PRINTERS AND PLOTTERS

PRINT-GAP ADJUSTMENTS INCREASE RIBBON LIFE

To get the most from your ribbon, adjust the gap between the head nose and the platen according to the age of your ribbon. With new ribbons, adjust the lever to the widest gap. Because the ribbon is new, the print quality should not be affected. As the ribbon wears, occasionally reduce the gap. When using emphasized mode, however, move the lever back to the widest step. When the ribbon gets old and characters become faint, tighten the lever to the smallest gap. If the print quality doesn't improve, you don't have a new ribbon, and you can put up with the slow printing speed, use emphasized mode. Finally, be sure to check the gap adjustment on your printer when using thick paper or multicarbon paper sheets.

Erik E. Erikson
Montrose, California

EPSON COMPRESSED ELITE SCRIPT

With an Epson FX printer, you can print spreadsheets with much smaller and higher-quality type by entering this custom setup, or initialization, string (the entire series of codes is entered as one line of numbers):

```
\015\027\077\027\083\
001\027\051\020
```

This produces compressed elite type in script mode. If you want more or less space between each line, adjust the last \020 up for more space or down for less. This lets you print the maximum 240 characters per line.

W. Ross Cox
Houston, Texas

DATAPRODUCTS 8070 COLOR PRINTER

To use the Dataproducts 8070 color printer with *1-2-3*, configure it as a Prism 80 or 132 in single-density mode and install the appropriate Prism drivers. As far as I can tell, everything works without further modification.

Eric Horn
Toledo, Ohio

EPSON LQ1500

We've discovered that to get any available print style with the LQ1500, you can use the Master Select series in ASCII, which is [ESC] "!" n, as explained on pages 3–54 of the 1983 LQ1500 operating manual. This translates to \027\033\nnn in decimal, in which *nnn* is the decimal number of the desired style. You choose the number of the desired print style (found in Appendix F of the LQ1500 manual) and type it into the *nnn* part of the setup string. Remember to insert zeros before the numbers that contain fewer than three characters. For example, 27 becomes \027, and 1 becomes \001.

Sheri Beaudry
Dallas, Texas

There are several versions of the LQ-1500 manual in circulation. According to a recent version, you can also use\027!\nnn to accomplish this task.

GRAPHICS CARDS

HIGH RESOLUTION ON 132-BY-44 DISPLAY

In the May issue, you state that *1-2-3* can display only 80-character column widths, and that *Symphony* with a Hercules board can only go up to 90 characters by 38 rows. However, I use a TLI UltraPak card to get a display of 132 characters by 44 lines in *1-2-3*. I got the *1-2-3* drivers needed to do this from TLI, and I know that TLI also has drivers for *Symphony*. The TLI card allows keyboard selectable displays of 80 by 25 or 132 by 44, provides high-resolution Hercules-compatible graphics, emulates full-screen color, and can coexist with a color adapter.

John Tate
Bellevue, Washington

These drivers are not available from Lotus. In addition, since neither the drivers nor the TLI board have been tested by Lotus, the Product Support staff cannot accept questions on their use.

WRITE US

Send us your hints on using printers, plotters, modems, expansion boards, monitors, input devices, and other peripherals. We'll pay you $25 for each hint we publish. Send your letters to Peripheral Hints, LOTUS *Magazine, P.O. Box 9123, Cambridge, MA 02139-9123.*

REVIEW: HOW TO USE LOTUS 1-2-3

This excellent audiocassette tutorial can lower company training costs.

BY TOM CAMPBELL

Remember the teaching machines of the 1960s and how audiocassette tapes were supposed to replace textbooks? And remember what a flop they turned out to be?

If you are a baby-boomer whose post-Sputnik education was punctuated by visits to the dreaded tape-listening room, you may be a little wary of cassette-based instruction. However, *How to Use Lotus 1-2-3*, by FlipTrack Learning Systems, might turn you into a learn-by-tape enthusiast.

FlipTrack's training kit consists of four audiocassettes and a 63-page manual. The name FlipTrack refers to a simple but effective way to customize the tutorial. At about half a dozen points on each tape, you are offered optional lessons on supplementary topics. To take those lessons, you stop the tape, set your tape recorder's counter to zero, turn the cassette over, and play the lesson. When finished, you rewind to zero, turn the cassette over again, and continue with the original lesson. The system is so well designed that you won't lose track of your position, no matter how many times you flip to the supplementary lessons.

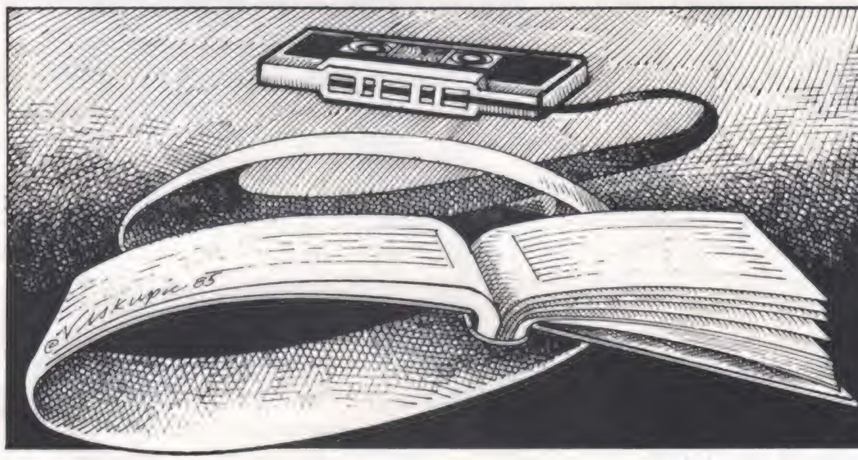
Each tape contains one lesson and takes two to three hours to complete. Tapes 1 and 2 focus on learning and using the *1-2-3* worksheet. Tape 3 deals with database management, and tape 4 covers graphs and macros. FlipTrack's developers used the manual to summarize key ideas from the tapes—they didn't simply transcribe the tapes and call it a manual. Unfortunately, the layout, packaging, and style of the manual don't do justice to the quality of the taped lessons.

The lessons are perfectly paced, pauses are appropriately placed, and supplementary lessons are clearly delineated. Lessons 1 and 2 revolve around the creation of a cash-flow model. You enter all the data yourself, which means that mistakes can easily snowball. Fortunately, you can usually catch errors because the narrator explains what each cell should look like. In addition, the tape mentions that the sample worksheet is in the manual, although you are never told where to find it. When you finally find it in the appendix, you discover that formulas and sums are not marked. An error in entering a formula means you must search from the beginning of the lesson until you find the part that you flubbed.

Another weakness is that you aren't taught how to save a file until the end of the first lesson. This can cause real trouble if you're interrupted before the lesson is over. Additionally, it was never made clear that numbers cannot be entered with embedded commas, even though *1-2-3* can format numbers and commas.

FlipTrack wisely avoided trying to replace *1-2-3*'s own tutorial and documentation. Instead, *How to Use Lotus 1-2-3* supplements the Lotus material. FlipTrack offers a firm but steady guide that lets you stop the tape at any time and change the worksheet in any way you wish, a welcome release from the Lotus tutorial's controlled environment. This gives you a lot of room to explore and to make mistakes. But mistakes are part of the process, and the consequences of an incorrect keystroke are minimized by a well-structured approach and numerous reminders of what your work should look like as you progress.

How to Use Lotus 1-2-3 doesn't teach all of *1-2-3*, but it covers common features and techniques, including spreadsheet fundamentals, database use, graphics, and macros. For $75 you get a package that could pay for itself with one use if the alternative is to hire a consultant or send company employees to a training class. *How to Use Lotus 1-2-3* is an excellent way for new users to get up to speed quickly. ■



GARY VISKUPIC

IN BRIEF

How to Use Lotus 1-2-3. FlipTrack Learning Systems, Mosaic Media Inc., 999 Main St., Suite 200, Glen Ellyn, IL 60137, 800-222-FLIP. Requires audiocassette tape recorder with tape counter. Released 10/83. $75. Four-week full guarantee.

Tom Campbell is a member of the technical team at Telos Corporation of Santa Monica, California.

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LISTINGS: TRAINING MATERIALS FOR 1-2-3

Disk, video, audio, and text tutorials for individual or classroom use

BEGINNER AND INTERMEDIATE

1-2-3 Skills
Logical Operations, 240 East Ave., Rochester, NY 14604, 716-262-2226. Disk-based courseware. Includes manual. Released 1/84. Requires 128K of RAM. $50 per disk and manual unit; commitment to 50 units per year required.

1-2-3 Skills for the Professional Trainer
Logical Operations, 240 East Ave., Rochester, NY 14604, 716-262-2226. Disk-based courseware. Includes instructor's guide and student manual. Released 12/84. Requires 128K of RAM. $3,000 licensing fee includes train-the-trainer session.

Arthur Young's Lotus 1-2-3 Self-Teaching Video Course
Arthur Young Business Systems, 1111 Summer St., Stamford, CT 06905, 800-543-3450; in Massachusetts, 617-647-9365. Videotape with tutorial disk and reference guide. Sections contain interactive case studies where appropriate. Released 4/84. Requires videotape player and 192K of RAM. $399.

Basic Concepts of: Lotus 1-2-3
Comm-Video Productions, 2950 East Mount Hope Rd., P.O. Box 268, Okemos, MI 48864, 800-422-8553. Videotape tutorial. Released 12/83. Requires VHS or Beta VCR and monitor. $39.95.

CompuTorial
Computer Literacy, 1109 Cypress St., Cincinnati, OH 45206, 513-281-2282. Audiocassette tutorial. Released 3/84. Requires audiocassette player. $59.95.

Digital Controls Learning Center
Digital Controls, 5555 Oakbrook Pkwy., Suite 200, Norcross, GA 30039, 404-441-3332. Three-hour laser videodisc tutorial. Includes workbook. Requires laser videodisc hardware (available for individuals at retail stores or provided by retailers for on-site training). Released 3/85. $625 for software; $4,995 for hardware.

DoMore with Lotus 1-2-3
Houghton Mifflin, 1 Beacon St., Boston, MA 02108, 617-725-5527. Disk-based tutorial. Requires 96K of RAM. Released 9/84. $75.

How to Use Lotus 1-2-3
FlipTrack Learning Systems, 999 Main St., Suite 200, Glen Ellyn, IL 60137, 800-222-3547; in Illinois, 312-790-1117. Four two-hour audiocassettes with indexed lesson summary. Released 11/83. Requires audiocassette player. $75. (*Reviewed in this issue.*)

Individual Training for Lotus 1-2-3
Individual Software, 1163-I Chess Dr., Foster City, CA 94404, 415-341-6116. Disk-based tutorial. Released 4/85. Requires 128K of RAM. $64.95.

Inside 1-2-3
National Training Systems, 1111 Broadway, Santa Monica, CA 90401, 213-394-7685. Disk-based tutorial with book and user's manual. Disk contains formatted spreadsheet templates. Released 12/84. Requires 192K of RAM. $49.95.

Introduction to Databases
Comprehensive Software, 2810 Artesia Blvd., Redondo Beach, CA 90278, 213-214-1461. Disk-based tutorial employs a question-and-answer approach with interactive examples. Updates and backups also available. Released 11/83. Requires 64K of RAM. $59.95.

Introduction to Lotus 1-2-3
Learn-PC Video Systems, 7430 West 27th St., Minneapolis, MN 55426, 800-532-7672; in Minnesota, 612-546-0552. Videotape, disk, command chart, and guidebook. Disk contains examples and answer guide. Released 1/84. Requires 32K of RAM and videotape player. $495.

Lotus 1-2-3: Introduction to the Integrated Spreadsheet
Anderson Soft-Teach, 2674 North First St., Suite 100, San Jose, CA 95134, 408-434-0100. Forty-minute videotape tutorial with guidebook. Requires videotape player. Released 11/83. $195.

Lotus 1-2-3 Made Easy
QED Information Sciences, QED Plaza, P.O. Box 181, Wellesley, MA 02181, 800-343-4848. Disk-based tutorial. Released 2/85. Requires 64K of RAM. $75.

Lotus 1-2-3 Training Course
Comprehension Research, 89 Sturges Hwy., Westport, CT 06880, 203-255-6539. Nine audiocassette lessons. Versions available for the IBM PC and compatibles or Burroughs B25 (N-GEN). Requires audiocassette player. Released 12/84. $150.

Putting 1-2-3 to Work
National Training Systems, 1111 Broadway, Santa Monica, CA 90401, 213-394-7685. Disk-based tutorial with manual. Released 8/83. Requires 192K of RAM. $75.

Startup–Video Training for Lotus 1-2-3
Computer Labs of America, 9619 Chesapeake Dr., Suite 105, San Diego, CA 92123, 619-576-1133. Three 40-minute videotape sessions. Released 12/84. Requires VHS (½-inch or ¾-inch) or Beta VCR. $399.

Tactics for Lotus 1-2-3, Part 1
Computer Tutor, 23 Central St., Wellesley, MA 02181, 617-237-1840. Training

guidebook plus template disk. Released 4/84. Requires 20K of RAM. $44.95 (Parts 1 and 2 together cost $75).

Teach Yourself Lotus 1-2-3, Volumes 1 and 2
American Training International, 12638 Beatrice St., Los Angeles, CA 90066, 213-823-1129. Disk-based tutorial with reference manual. Split-screen approach simulates *1-2-3* program on top and provides instructions on bottom. Released 12/84. Requires 64K of RAM. $75 for both volumes.

Teach Yourself Lotus 1-2-3
Cdex, 1885 Lundy Ave., San Jose, CA 95131, 800-982-1213. Disk-based tutorial with reference guide. Released 6/84. Requires 128K of RAM. Color-graphics adapter and graphics monitor required for graphics section. $69.95.

TLS Tutor for Lotus 1-2-3
Total Learning Systems, 3451 Northwest 55th St., Fort Lauderdale, FL 33309, 305-0485-6882. Audiocassette tutorial. Released 4/85. Requires audiocassette player. $29.95.

Using Lotus 1-2-3 in Business, Part I
Edutrends, 69-49 Park Dr. E., Kew Gardens, NY 11367, 718-793-5262. Disk-based, interactive tutorial. Includes workbook. Requires 192K of RAM and *1-2-3*. Released 1/85. $79.99. Also available as courseware, including leader's guide. Released 3/85. $300 licensing fee covers unlimited usage per location.

Using the Lotus 1-2-3 System
SRA/IBM, 155 North Wacker Dr., Chicago, IL 60606, 312-984-7251. Courseware includes a handbook and disk for a 6-to-8-hour tutorial. Released 10/84. Requires 128K of RAM. $75 per book and disk unit; discounts available on volume orders.

Using 1-2-3 Workbook and Disk
Que, 7999 Knue Rd., Indianapolis, IN 46250, 317-842-7162. Courseware designed to accompany *Using 1-2-3* book (also from Que) includes workbook, disk, and instructor's guide. Workbook and disk released 9/84. $29.95. Instructor's Guide released 1/85. $14.95.

INTERMEDIATE AND ADVANCED

Advanced 1-2-3 Skills
Logical Operations, 240 East Ave., Rochester, NY 14604, 716-262-2226. Disk-based courseware. Includes manual. Released 1/84. Requires 128K of RAM. $50 per disk and manual unit; commitment to 50 units per year required.

Advanced Concepts of: Lotus 1-2-3
Comm-Video Productions, 2950 East Mount Hope Rd., P.O. Box 268, Okemos, MI 48864, 800-422-8553. Videotape tutorial. Released 12/83. Requires VHS or Beta VCR and monitor. $99.95.

Advanced Training for the Lotus 1-2-3 Program
Cdex, 1885 Lundy Ave., San Jose, CA 95131, 800-982-1213. Disk-based tutorial with reference guide. Includes a disk of formatted *1-2-3* templates. Originally released 3/84. Requires 64K of RAM. $69.95.

All About Lotus 1-2-3
JNM Systems, 542 Village Dr., Edison, NJ 08817, 201-572-3306. Disk-based tutorial with user's guide. Disks contain interactive tests and examples. Released 5/85. Requires 192K of RAM. $110.

Lotus 1-2-3: Advanced Features
Anderson Soft-Teach, 2674 North First St., Suite 100, San Jose, CA 95134, 408-434-0100. Forty-minute videotape tutorial with guidebook. Released 11/83. Requires videotape player. $195.

Tactics for Lotus 1-2-3, Part 2
Computer Tutor, 23 Central St., Wellesley, MA 02181, 617-237-1840. Training guidebook with template disk. Released 10/84. Requires 20K of RAM. $44.95 (Parts 1 and 2 together are $75).

Using Lotus 1-2-3 in Business, Part II
Edutrends, 69-49 Park Dr. E, Kew Gardens, NY 11367, 718-793-5262. Disk-based, interactive tutorial. Includes workbook. Requires 192K of RAM and *1-2-3*. Released 1/85. $79.99. Also available as courseware, including leader's guide. Released 3/85. $300 licensing fee covers unlimited usage per location.

BUSINESS APPLICATIONS

Analyzing Business Investment Opportunities Using Lotus 1-2-3
Cdex, 1885 Lundy Ave., San Jose, CA 95131, 800-982-1213. Disk-based tutorial with reference guide. Package includes a disk of templates. Originally released 8/84. Requires 128K of RAM. $69.95.

Analyzing Financial Statements Using Lotus 1-2-3
Cdex, 1885 Lundy Ave., San Jose, CA 95131, 800-982-1213. Disk-based tutorial with reference guide. A separate disk contains worksheet templates. Originally released 5/84. Requires 128K of RAM. $69.95.

Also available from Deltak, East/West Technological Center, 1751 Diehl Rd., Naperville, IL 60566, 800-532-7686; in Illinois, 312-369-3000.

Analyzing Sales Performance Using Lotus 1-2-3
Cdex, 1885 Lundy Ave., San Jose, CA 95131, 800-982-1213. Disk-based tutorial with reference guide. Package includes a separate disk containing five formatted worksheets. Released 9/84. Requires 128K of RAM. $69.95.

Building a Business Plan Using Lotus 1-2-3
Cdex, 1885 Lundy Ave., San Jose, CA 95131, 800-982-1213. Disk-based tutorial with reference guide. A separate disk contains 11 formatted worksheets for major business plan components. Originally released 10/84. Requires 128K of RAM. $69.95.

Making Key Business Decisions with Lotus 1-2-3
Cdex, 1885 Lundy Ave., San Jose, CA 95131, 800-982-1213. Disk-based tutorial with reference guide. A separate disk contains relevant worksheets. Originally released 1/84. Requires 64K of RAM. $69.95.

Also available from Deltak, East/West Technological Center, 1751 Diehl Rd., Naperville, IL 60566, 800-532-7686; in Illinois, 312-369-3000.

Managing Your Business with Lotus 1-2-3
Cdex, 1885 Lundy Ave., San Jose, CA 95131, 800-982-1213. Disk-based tutorial with reference guide. A separate disk includes 10 relevant formatted worksheets. Originally released 6/83. Requires 64K of RAM. $69.95.

Also available from Deltak, East/West Technological Center, 1751 Diehl Rd., Naperville, IL 60566, 800-532-7686; in Illinois, 312-369-3000. ■

WRITE US

Have you used any of these products? Tell us which ones you like or don't like, and why. We'll send you $25 for every comment we print in our upcoming "Reader Review" section. Send your letters to: Listings Editor, LOTUS *Magazine, P.O. Box 9123, Cambridge, MA 02139-9123.*

EVENTS

EVENT	AUDIENCE	DATE	LOCATION	SPONSOR
Computer Graphics	Business and Management Graphic Designers	August 13–15	Boston, Massachusetts Bayside Exposition Center	National Computer Graphics Association P.O. Box 3412 McLean, VA 22103 800-225-6242
Information Center Conference and Exposition	Corporate End Users, DP/MIS Professionals	August 18–22	Nashville, Tennessee Opryland Hotel	Melissa DePaoli Warren-Weingarten Inc. 38 Chauncy Street Boston, MA 02111 617-542-0146
Macworld Exposition	End Users	August 21–23	Boston, Massachusetts Bayside Exposition Center	Mitch Hall Associates 1200 East Street Westwood, MA 02090 617-329-8092
Intech '85	MIS, DP, and Office Automation Professionals	August 26–29	San Francisco, California Moscone Center	NUA/Intech '85 2111 Eisenhower Avenue Suite 400 Alexandria, VA 22314 800-638-8510
Tampa Bay Computer Show and Business Equipment Expo	End Users	September 12–15	Tampa, Florida Curtis Hixon Convention Center	Compushows Inc. P.O. Box 3315 Annapolis, MD 21403 301-263-8044
Mid-Atlantic Computer Show	End Users	September 26–29	Washington, D.C. Convention Center	Compushows Inc. P.O. Box 3315 Annapolis, MD 21403 301-263-8044

LOOKING AHEAD

Southeast Computer Show and Business Equipment Expo	End Users	October 3–6	Atlanta, Georgia Civic Center	Compushows Inc. P.O. Box 3315 Annapolis, MD 21403 301-263-8044
Info '85	Corporate End Users	October 14–17	New York, New York New York Coliseum	Cahners Exposition Group 999 Summer Street P.O. Box 3833 Stamford, CT 06905 203-964-0000
Rocky Mountain Computer Show	End Users	October 17–20	Denver, Colorado Merchandise Mart	Compushows Inc. P.O. Box 3315 Annapolis, MD 21403 301-263-8044
Federal Office Automation Exposition	End Users	October 30–31	Washington, D.C. Convention Center	Federal Office Automation Conference P.O. Box 322 Wayland, MA 01778 617-358-5301
Twin Cities Computer Show and Business Equipment Expo	End Users	October 31–November 3	St. Paul, Minnesota Civic Center	Compushows Inc. P.O. Box 3315 Annapolis, MD 21403 301-263-8044

Sometimes the best way to get ahead is to go sideways.

The problem with spreadsheets is they get printed the wrong way.

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Sideways is the clever software program that prints your spreadsheets—you guessed it—sideways. So your spreadsheet columns need never fall off the edge of your printer paper again.

With Sideways on your side, no spreadsheet you invent with Lotus 1-2-3,® Symphony,™ VisiCalc,® Multiplan,® or SuperCalc™ is too wide! And it's just as powerful an ally when you're creating far-into-the-future schedules and pert charts. So for a presentable printout, get rid of that glue stick and scotch tape—put your best foot forward and go Sideways.

You can go Sideways today with an IBM® PC or an Apple® II, and over a dozen different printers, including Epson,® Okidata, IBM,® Apple,® C. Itoh and Mannesmann Tally. Ask for Sideways at your local ComputerLand,® Entre, or other computer store. Or mail a $60 check to Funk Software, P.O. Box 1290, Cambridge, MA 02238. Or call 617-497-6339. MC/Visa accepted.

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SIDEWAYS PRINTS SPREADSHEETS SIDEWAYS.

EXPANDED MEMORY BOARDS AND MORE

This month we've remembered memory boards, but haven't forgotten other products.

1-MEGABYTE MEMORY-EXPANSION SYSTEM

The ODM card is a memory board for the IBM PC, PC XT, and Compaq Plus that includes up to 1 megabyte of memory, 896K DOS-addressable RAM, electronic disk capability outside the 896K DOS-addressable RAM, and the ability to be configured with other memory cards.

Combining the ODM card with the optional Mega-Omega SPC card adds serial, parallel, and game ports, and a real-time clock without using another slot on the PC. The optional Mega-Omega Battery Backup Unit retains data in power failures on the ODM RAM disk for about two hours.

A 1-megabyte ODM board costs $695, and a 256K board sells for $395. The optional SPC card and Battery Backup Unit are $195 each. All products are from Mega-Omega Systems, 5217 Ross Ave., Suite 710 LB 122, Dallas, TX 75206, 214-828-0960.

CIRCLE 1 ON READER SERVICE CARD

EXPANDED MEMORY FOR THE AT&T 6300

Fastcard I, using 256K semiconductor memory chips, is designed for the AT&T 6300, IBM PCs, and compatibles and allows expansion of main memory to 640K.

Fastcard I includes *Fastware TMS 3.0*, a high-performance utility software that provides disk access as much as 100 times faster, depending on system size and applications used. This reduced disk-access time is accomplished by reserving an area of system RAM to be used only by *Fastware TMS 3.0* for disk caching and print spooling.

The Fastcard I, including *Fastware TMS 3.0*, retails for $325 and is manufactured by Thesys Memory Products, 7345 East Acoma Dr., Scottsdale, AZ 85260, 602-991-7356.

CIRCLE 2 ON READER SERVICE CARD

STRETCHING PC MEMORY

The Persyst Stretch memory board offers up to 2 megabytes of RAM for the IBM PC and compatibles to support the new bank-switching capabilities of *Framework* Version 1.1, and the forthcoming *1-2-3* Release 2.0 and *Symphony* Release 1.1, enabling users to build larger databases and spreadsheets.

Stretch supports 256K RAM chips and switches for address selection and offers up to 2 megabytes of expandable memory. With 0K of RAM, the board costs $295; a 256K board sells for $495, and a 2-megabyte board retails for $1,895. The board is available from Emulex, 3545 Harbor Blvd., P.O. Box 6725, Costa Mesa, CA 92626, 714-662-5600.

CIRCLE 3 ON READER SERVICE CARD

MEMORY EXPANSION FOR THE IBM XT

STB Systems recently introduced an upgraded version of the Rio Plus II multifunction board, providing up to 576K of additional memory.

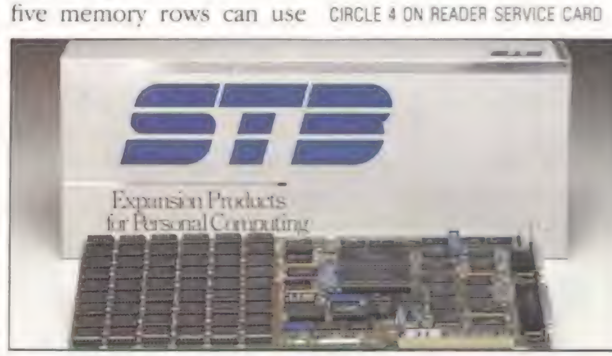
Designed for the IBM PC AT, PC XT, and compatibles, the Rio Plus II offers 384K of RAM on the AT and 576K of RAM on the XT, compatibles, and on PCs equipped with XT motherboards.

The board is available with 64K, 256K, 384K, or 576K installed, and all memory is expandable. The first five memory rows can use 64K chips, and the last row can use 64K or 256K chips.

STB's Rio Plus II provides an IBM-compatible parallel port, two asynchronous RS-232C serial ports, a battery-operated clock/calendar, and an optional game port.

The Rio Plus II costs $349 for 64K, $574 for 256K, $724 for 384K, and $899 for 576K. It is manufactured by STB Systems, 601 North Glenville, Suite 125, Richardson, TX 75081, 214-234-8750.

CIRCLE 4 ON READER SERVICE CARD



NEW PRODUCTS

MEMORY SAILING WITH ABOVE BOARDS

Above Board/PC and Above Board/AT are hardware-software combinations that allow users to manage spreadsheets and databases as much as 10 times the size previously possible. They are supported by the new *Symphony* 1.1, the forthcoming version of *1-2-3*, and Ashton-Tate's *Framework*.

Above Board incorporates the Lotus/Intel Expanded Memory Specification, which provides expanded RAM up to 4 megabytes beyond 640K. Four Above Board/PC units with 2 megabytes each can expand IBM PC and PC XT memory up to 8 megabytes. Two Above Board/ATs, each with a maximum of 4 megabytes, can expand the PC AT memory up to 8 megabytes by using Piggyback Memory. Above Board's *Expanded Memory Manager* software supervises the expanded memory and supports multiple applications. A user can install a RAM disk and a print buffer by following menu-driven procedures.

Above Board can be used with the 8087/80287 Math Coprocessors. The Above Board/Math Coprocessor combination furnishes the workspace needed for large spreadsheets and makes fast manipulation possible.

Above Board/PC retails for $395 with 64K, $595 with 256K, and $1,395 with 2 megabytes. Above Board/AT costs $595 with 128K, $995 with 512K, and $1,495 with 2 megabytes. Piggyback Memory for Above Board/AT with 128K is $295, $795 with 512K, and $1,195 for 2 megabytes. All products are available from Intel, Personal Computer Enhancement Operation, TOC-03, 5200 Northeast Elam Young Parkway, Hillsboro, OR 97124, 503-629-7354.

CIRCLE 5 ON READER SERVICE CARD

BIGGER SPREADSHEETS ON THE PC AT

The Extender for Lotus *1-2-3* allows the power user to address almost twice the usable spreadsheet memory on the PC AT, from about 500K to 920K.

This software utility works with existing releases of *1-2-3* and does not require an upgrade. The company plans similar extensions for such programs as *Symphony*, *TopView*, and *Framework*.

Available for $99, *The Extender* may be purchased from Uniform Software Systems, 225 Santa Monica Blvd., Suite 514, Santa Monica, CA 90401, 213-395-9674.

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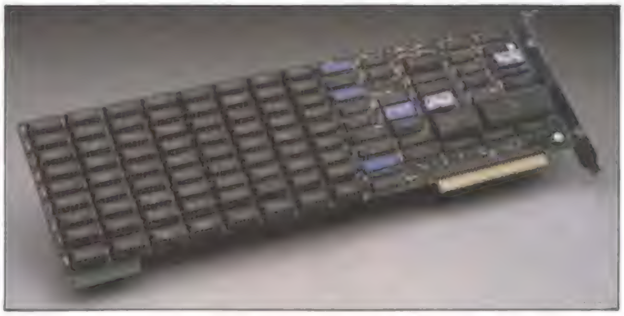
NEW PRODUCTS

FREEDOM WITH THE LIBERTY BOARD



Used in conjunction with the Lotus/Intel Expanded Memory Specification for *1-2-3* and *Symphony*, the Liberty memory board from Quadram provides an additional 2 megabytes of RAM.

Liberty has split-memory mapping, which completes the system memory of 640K. In addition, even if your software does not allow expanded memory for data storage, the Liberty board provides multiple RAM disks and print spoolers while leaving 640K of RAM free for processing.

The Liberty memory board costs $395 with 64K, $595 with 512K, $895 with 1 megabyte, and $1,295 with 2 megabytes. It is manufactured by Quadram, 4355 International Blvd., Norcross, GA 30093, 404-923-6666.

CIRCLE 7 ON READER SERVICE CARD

ERROR-DETECTION MEMORY BOARD

Eccell AT is a multifunction board for the IBM AT with memory-error detection and correction. ECC (error-correction code) is an error-correction system usually found on mainframes and minicomputers. It corrects memory errors before they stop the system and ruin data. ECC can be purchased with the board or added later as an upgrade.

The Eccell AT also includes the new Lotus/Intel Expanded Memory Specification, allowing users to access virtually all of the PC AT's memory capability.

With intelligent circuitry, plus a menu-driven installation program, the Eccell AT can be installed in five minutes. A parallel printer port and asynchronous serial port provide standard, IBM-compatible connections for printers, modems, and other peripherals.

A feature called RAM-Intact WarmBoot allows the AT to be shut off and restarted without losing the contents of RAM above 1 megabyte.

A high-capacity disk-caching feature can increase disk access speed up to 10 times. In addition, the high-capacity RAM disk provides up to 15 megabytes of virtual disk drive, accessible from the emulation mode of the PC AT.

The Eccell AT memory board carries a two-year warranty and sells for $695 with 0K of RAM. It is from Orchid Technology, 47790 Westinghouse Dr., Fremont, CA 94539, 415-490-8586.

CIRCLE 8 ON READER SERVICE CARD

READER EVALUATION

Your comments about Lotus magazine help us bring you the best editorial product each month. To rate the articles in this issue, scan the list below and refer to the READER EVALUATION section on the Reader Service card to the left. Identify the number corresponding to each article or feature, then circle the number on the card that reflects your rating.

AND COMING NEXT MONTH:

- **Introducing Release 2 of *1-2-3***
- **Minimizing Financial Costs**
- **Tips for Using On-Line Information Services**
- **Generating Labeled Histograms**
- **The Macintosh at Peat, Marwick, Mitchell & Co.**
- **Easier Subtotals**
- **Reviews: *CPA+ Accounting System; 1-2-3 Macro Aids;* HP LaserJet Printer**
- **1-2-3 Macros: More Power**
- **Symphony Macros: Alternative Menus**

EXPANDED MEMORY AND MONITOR DISPLAY ON ONE BOARD

The UltraPAK 256 uses the new 256K memory chip technology to add 256K of memory, expandable to 384K on an IBM PC or PC XT or 512K on a compatible.

The UltraPAK has a printer port that can be switched to LPT1 or LPT2, one standard and one optional serial port, and a battery-backed clock/calendar including software to set the system clock when the computer is turned on. Display features include a 132-column display, Hercules-compatible graphics, and color-graphics emulation for a monochrome screen.

Included with the package are a screen driver, text driver, print spooler, ANSI-standard screen driver, and RAM disk software.

The UltraPAK 256 with 256K of RAM installed costs $899 from Tseng Laboratories, 205 Pheasant Run, Newtown Commons, Newtown, PA 18940, 215-968-0502.

CIRCLE 9 ON READER SERVICE CARD

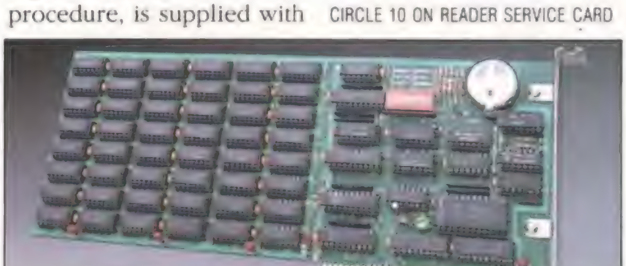
MULTIPLE MEMORY MODIFICATION

Seattle Computer has introduced a new dual-function board for IBM PCs and compatibles. RAM 7 is a memory-expansion board that includes a clock/calendar and is available with 256K, 320K, or 384K of RAM.

Documentation, including a four-step installation procedure, is supplied with the board. Buyers are given a 10-day return privilege.

A 256K RAM 7 board retails for $195, a 320K unit sells for $210, and a 384K board costs $225, from Seattle Computer, 7649 South 180th St., Kent, WA 98032, 206-251-9677.

CIRCLE 10 ON READER SERVICE CARD



MULTIPLE MEMORY ENHANCEMENT PRODUCTS FOR THE PCjr

Tecmar's jrCaptain memory board adds 128K of memory to the PCjr, providing a total of 256K. By adding a jrCadet board to the jrCaptain, 640K is possible, allowing users to run PC software previously not available for the PCjr.

What Tecmar calls a Treasure Chest of Software is included with the jrCaptain memory board. It includes an electronic Rolodex, checkbook balancing, memo writer, three-dimensional tic-tac-toe, time and date setter, and a printer buffer.

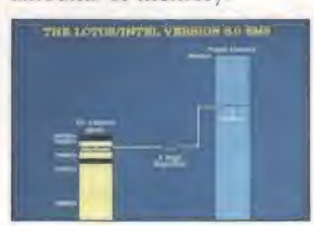
Tecmar also includes a program that establishes a disk drive in RAM. This electronic disk is useful for copying disks and applications requiring fast and frequent disk access.

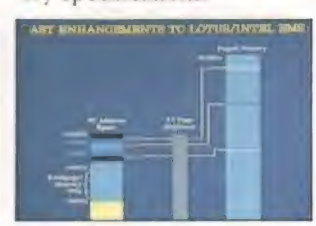
The jrCaptain is $315 with 64K, $395 with 128K; the jrCadet is $275 with 128K, $595 with 384K, from Tecmar, 6225 Cochran Rd., Solon, OH 44139-3377, 216-349-0600.

CIRCLE 11 ON READER SERVICE CARD

ADDITIONAL 16K BLOCK ACCESS WITH NEW MEMORY BOARD

Rampage! from AST Research is a 2-megabyte board for the IBM PC that uses an enhanced set of the Lotus/Intel Expanded Memory Specification to boost the performance of applications and multiuser software requiring large amounts of memory.





In conjunction with Ashton-Tate and Quadram, AST designed Rampage! to provide up to four times as much total area in which to exchange data in the PC's high memory, between 640K and 1 megabyte. Rampage! can page directly into memory below 640K, and when combined with the board's split-memory addressing capability, it allows users to round out conventional memory to 640K.

Included with Rampage! is the *Expanded Memory Manager*, a software driver that accesses the added memory in pages. The driver works with the applications software to exchange pages between the PC's normal address range and the 16K blocks available from 640K to 1 megabyte. This technique doubles the amount of paging area in the normal expanded memory specifications.

As many as four Rampage! boards can be installed to expand PC memory by as much as 8 megabytes beyond the 640K threshold of the IBM PC, PC XT, and compatibles. Rampage! also includes AST's *SuperPak* utility software, which includes *SuperDrive*, a RAM disk simulator that speeds processing, and *SuperSpool*, which allows users to enter data while printing.

Rampage! costs $595 with 256K RAM, from AST Research, 2121 Alton Ave., Irvine, CA 92714, 714-863-1333.

CIRCLE 12 ON READER SERVICE CARD

It's Easy With AST-5251/11:™ Fast Hookup, File Transfer And Extra Capabilities

Standard Twinax Cable Support Makes Installation A Snap. AST-5251/11 and twinax connection means easy, cost effective direct cable attachment of your PC to your IBM® System 34/36/38—no expensive communications adapter necessary. Just plug our AST-5251/11 emulation board into your PC/AT/XT, portable or compatible and connect the twinax cable. With this complete hardware/software solution that's all it takes to use your PC just like a standard IBM 5251/11 terminal.

File Transfer Is Only The Beginning. Use your PC as always, and emulate a Model 11 terminal—with powerful extra capabilities—to access your host minicomputer. Then transfer files bi-directionally between your host and PC, in a ready-to-use format.

Use Your Favorite PC Software. AST's file transfer support not only eliminates the burden and the errors of re-keying, it adds the ability to manipulate transferred data using your favorite PC software packages, like Lotus 1-2-3™ and WordStar.® And our Hot-Key support lets you conduct concurrent DOS and host sessions, while our applications program interface (API) makes integrating PC and host applications simple.

Even Greater Efficiency. AST-5251/11 also provides host-addressable 5256 printer emulation for your PC printer in a background mode.

See your dealer today, or call our Customer Information Center (714) 863-1333 for more information. AST Research, Inc., 2121 Alton Avenue, Irvine, CA 92714 TWX: 753699ASTR UR.

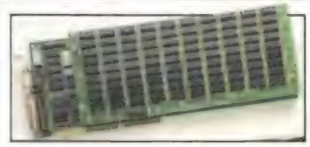
KEY FEATURES

- *Plugs into PC/XT/AT and compatibles, connects to System 34/36/38 via twinax cable and supports cable thru.*
- *Emulates 5251-11, 5291 or 5292-2 display terminal.*
- *Provides host-addressable 5256 printer support (background mode) on PC-attached printer.*
- *Selectable DMA and I/O interrupt channels.*
- *Application program interface and bidirectional file transfer included.*
- *Complete package includes hardware, software, twinax cable assembly, and comprehensive user manuals.*
- *Supports fixed or hard disk.*
- *Hot-Key assist for concurrent host and PC sessions.*

AST
RESEARCH INC.

CIRCLE 147 ON READER SERVICE CARD

MULTIFUNCTION BOARD FOR THE AT



The Idea Supermax, an IBM PC AT-compatible multifunction board, offers two serial ports and a parallel port and has a maximum memory of 4 megabytes. The board's memory can be expanded using either 64K or 256K RAM chips. With 64K chips, Supermax memory can be expanded to 1.5 megabytes. With 256K RAM chips and an additional piggyback board, memory can be extended to 4 megabytes.

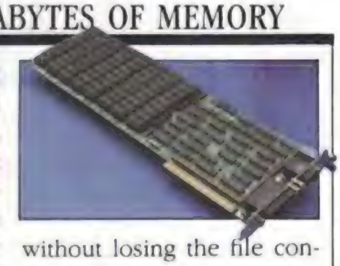
A typical application for the Idea Supermax is for an AT that functions as a file server in a local area network. Also, applications running under XENIX that require large amounts of memory are ideally suited to Supermax.

Idea's menu-driven software is included with the Supermax board and features diagnostics, a print spooler, a RAM disk, and a calculator. The built-in split-memory addressing feature rounds out the AT's base memory to 640K, extends memory above 1 megabyte, and permits quick access to files.

Suggested retail prices for the Supermax range from $495 for a bare board to $3,795 for 4 megabytes of memory. The board is manufactured by IdeAssociates, 35 Dunham Rd., Billerica, MA 01821, 617-663-6878.

CIRCLE 13 ON READER SERVICE CARD

ACCESS UP TO 8 MEGABYTES OF MEMORY



Tall Tree Systems is offering a new member of the JRAM family of memory boards, the JRAM-3, which uses the Lotus/Intel Memory Specification and can access up to 8 megabytes of RAM for larger and more efficient spreadsheets, faster arithmetic processing, and easier access to DOS. JRAM-3 can also be used for DOS memory, electronic disk, print spooler, and *TopView* applications. It requires only one instruction to change window addressing.

JRAM-3 suppresses noise electronically and reduces sensitivity problems with 256K chips. It holds eight banks of RAM with 256K chips, providing 2 megabytes of memory in one expansion slot.

JRAM-3 comes with the *Jetdrive* and *JSpool* software packages. *Jetdrive* creates up to four RAM disks of any size in 64K increments and can withstand a warm boot without losing the file contents. *JSpool* is a print spooler in RAM that allows users to print text or graphics while running another program.

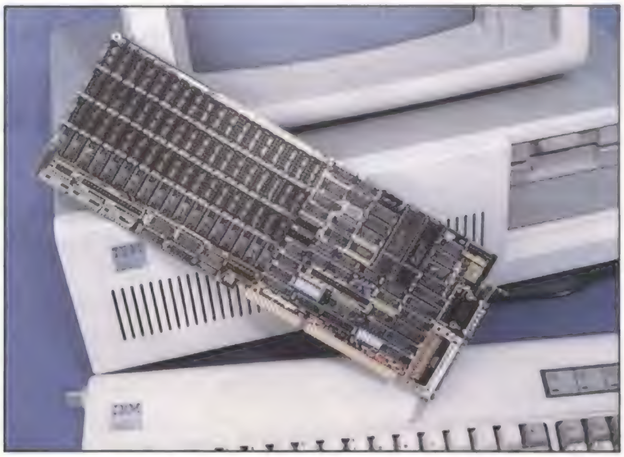
Tall Tree software uses installable device drivers, making it compatible with other software. All JRAM boards are modular, and the JRAM-3 board has sockets for one of several modules: serial ports, parallel ports, and a clock/calendar.

The JRAM-3 with 2 megabytes costs $699. A JRAM-3 with a single bank of 256K chips retails for $399. The JRAM-3 is from Tall Tree Systems, 1120 San Antonio Rd., Palo Alto, CA 94303, 415-964-1980.

CIRCLE 14 ON READER SERVICE CARD

NEW PRODUCTS

CHALLENGING COMPUTER MEMORY



The Challenger from Advanced Logic Research offers 4 megabytes of memory, four serial ports, a parallel port, and a game port in a single slot on your IBM PC AT.

The Challenger offers double split-memory addressing, one for a nonenhanced 256K system and one for an enhanced 512K system. Both systems round out the AT's memory to 640K and then expand past the 1-megabyte boundary with either 64K or 256K memory chips.

The Challenger with 128K of memory, a serial port, a printer port, and the *VSpool* print spooler costs $485, from Advanced Logic Research, 23532 El Toro Rd., Unit 6, El Toro, CA 92630, 714-380-7798.

CIRCLE 15 ON READER SERVICE CARD

REDUCE VDT GLARE

The Vu-Tek contrast-enhancement filter from American Hoechst is designed to eliminate up to 99 percent of the glare from terminal screens.

Vu-Tek reduces reflected glare and increases contrast and legibility. Glare is reduced by combining a circular polarizer with an antireflective optical coating on a glass panel.

The Vu-Tek filters fit more than 800 terminals, and custom sizes can be ordered. The screen costs $119, from American Hoechst, Specialty Film Products Division, 805 Via Alondra, Camarillo, CA 93010, 805-987-8801.

CIRCLE 16 ON READER SERVICE CARD

PUBLISHING SOFTWARE FOR THE MACINTOSH

PageMaker, the first in a series of publishing products from Aldus, is software for designing and producing typeset-quality publications in an office environment.

With *PageMaker*, professional-looking publishing jobs for newsletters, data sheets, price lists, manuals, proposals, and presentations, are possible.

PageMaker runs on the Macintosh 512K system and costs $495. It is available from Aldus, 616 First Ave., Suite 400, Seattle, WA 98104, 206-467-8165.

CIRCLE 17 ON READER SERVICE CARD

IBM PC FOR THE FINANCIAL COMMUNITY

IBM is offering a PC for banks and other financial institutions. The IBM 4700 PC is a version of the PC XT that can combine data from stand-alone PC programs with such applications as new account and loan processing in the IBM 4700 Finance Communication System (FCS). Spreadsheet or word-processing applications can be used to review or change information in the financial databases of large computer systems.

The 4700 workstation has a 107-key finance keyboard that can work with keypads for entering personal identification numbers, magnetic strip readers, and other devices in the 4700 FCS family. The keypad is tailored for banks and financial institutions and has a 62-key typewriter layout and three sets of function keys, which can be programmed to do specific tasks.

Optional features include a 4700 financial printer, and a financial-security option that encrypts and decrypts data. IBM PC and PC XT users can operate their units as 4700 PCs by installing any of three options that include circuit cards and diagnostic disks.

The 4700 PC costs $3,989. For information on this and other IBM products, call 800-426-2468.

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CUSTOM-DESIGNED KEYBOARD MACROS

Keyworks is menu-driven software for creating keyboard macros. Users can record sequences of keystrokes, such as commands for applications programs such as *1-2-3* or frequently used words or phrases, and then recall them with one or two keystrokes. To customize a program, a user can create macros to accomplish each of these tasks by hitting one key. Menus listing these macros can then be recalled to the screen in the form of windows.

The software can display an on-screen directory of each macro and what it does, and a full-screen, pop-down editor for changing macros. It also contains a screen-save feature that shuts off display after a specified time to avoid burning an image onto the screen.

Keyworks requires a minimum of 64K, one disk drive, and DOS 2.0 or higher. It is compatible with many programs, including *1-2-3*, *MultiMate*, *WordStar*, *SuperCalc*, *Multiplan*, *dBase II*, and *dBase III*. It costs $89.95, from Alpha Software, 30 B St., Burlington, MA 01803, 617-229-2924.

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PROFESSIONAL MICRO PRINTERS

The Mannesmann Tally MT85 and MT86 dot-matrix printers offer plug-in interface modules, changeable type-style cartridges, and printing at 180 characters per second (cps) for draft or 45 cps for near-letter quality. The MT85 is available in 80-column width, and the MT86 is 136 columns wide.

The printers are compatible with a variety of software and hardware, including complete emulation of the IBM PC Graphics Printer, the Epson FX series, and Apple Imagewriter printers. Options include a choice of plug-in type-style cartridges and fabric or film ribbons. Type styles include Courier, Letter Gothic, and Script Italics. Quadrato is the standard type style.

The MT85 costs $499 and the MT86 is $599, from Mannesmann Tally, 8301 South 180th St., Kent, WA 98032, 800-447-4700.

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BRINGING THOSE NEW IDEAS TO MARKET

BY THOMAS MAHON

The entrepreneur/venture-capital tango is slowing to a sedate tempo. At watering holes from San Francisco to Boston, potential entrepreneurs bemoan the lack of venture money. Meanwhile, in select clubs in the country's financial centers, members talk about a shortage of good, marketable ideas.

In fact, according to Jane Koloski Morris, editor of *Venture Capital Journal*, startup activity hasn't really diminished since the fever pitch of 1983. There has been no letup in the deal flow or in the approximately $3 billion in venture money available. Still, perceptions count for a lot in fast-moving industries in which impressions become reality if entrepreneurs give up and financiers look elsewhere.

The support of the enterprising by the venturesome goes back a long way. Perhaps the best-known venture-capital deal before this century was Queen Isabella's support of Columbus. Sacramento merchants grubstaked gold miners. Highly speculative investments in new enterprises by wealthy individuals and families, such as the Rockefellers' in Eastern Airlines, were not uncommon.

In the mid 1970s young, experienced managers in first-generation technology companies understood the technical significance and business potential of the new microprocessor, and they increased venture-capital funding. Coupled with that was the oil embargo and the sense in the financial community that the future lay in processing infinite amounts of information, not finite amounts of energy. Mutual insights merged with enlightened self-interest (and the capital gains tax was lowered), setting the stage for the heyday between 1978 and 1983 that eventually became too much of a good thing.


Thomas Mahon

Too many deals were made too quickly in too few areas. Was the world really ready for 35 different disk-drive companies or 150 different personal-computer companies? The tumultuous shakeout of individual computer-industry companies since 1983 has caused a widespread erosion of faith in the entrepreneur/venture-capital phenomenon.

Embittered entrepreneurs claim that no one will back them, but in fact, money is still available. What has changed is the number of dealers trying to break into the charmed circle. Too, the money seems to be going into later rounds, not into startups, and after more thorough investigation of the prospective companies.

Just as the transistor—the device that launched the modern electronic age—was used to amplify electronic signals, so, figuratively speaking, the inventions that grew from the transistor—the integrated circuit and the microprocessor—have amplified human activity many times over. Customers will pay a premium to become more productive and to do more with limited activity (whether through hardware or software). Hence, companies that provide products that amplify human endeavors stand to be profitable and therefore good investments. Spasms will continue in the unfolding, but the trend is deeply set now.

Not only do the new technologies amplify human endeavor, but they build on themselves. Where will the next growth area be? Somewhere today—in Silicon Valley or along Route 128 outside Boston or in Chicago or in Dar es Salaam—someone is at work on a software product that will legitimize the home computer in the way that word processors, spreadsheets, databases, and integration products legitimized the personal computer in the office. Somebody, somewhere, is working on a notion so elegant that we'll all slap our foreheads and ask, "Why didn't I think of that?"

But where will that entrepreneur get the support to transform an inspired insight into a marketable product backed by a functioning organization? Only a motivated individual or small group knowing both the potentials and the risks of new ventures, someone with deep pockets, patience, and wide-ranging business contacts, can support an idea and get it to market before the compatibles-makers step in.

Investors will continue to understand the profit potential of new products that make people more productive. The details of the deals may change, but not the activity itself. It's not likely to let up now as we investigate genetic engineering, artificial intelligence, robotics, communications, space travel, and all those other areas yet to be explored. ■

Thomas Mahon lives in the San Francisco Bay area and is the author of Charged Bodies—People, Power and Paradox in Silicon Valley, *from New American Library.*

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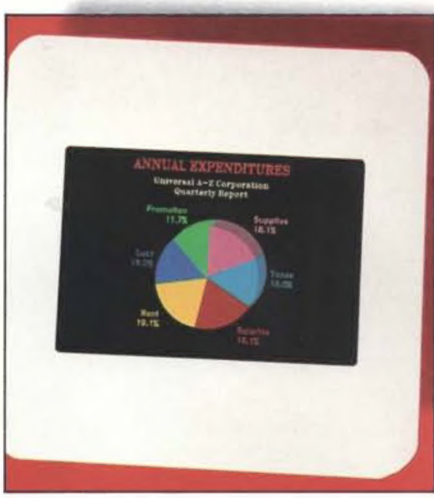

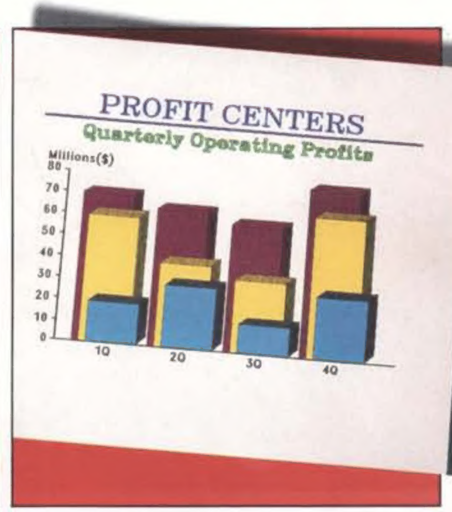

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